morrison

DINOSAURS!

•DISCOVER THE GIANTS OF THE PREHISTORIC WORLD•

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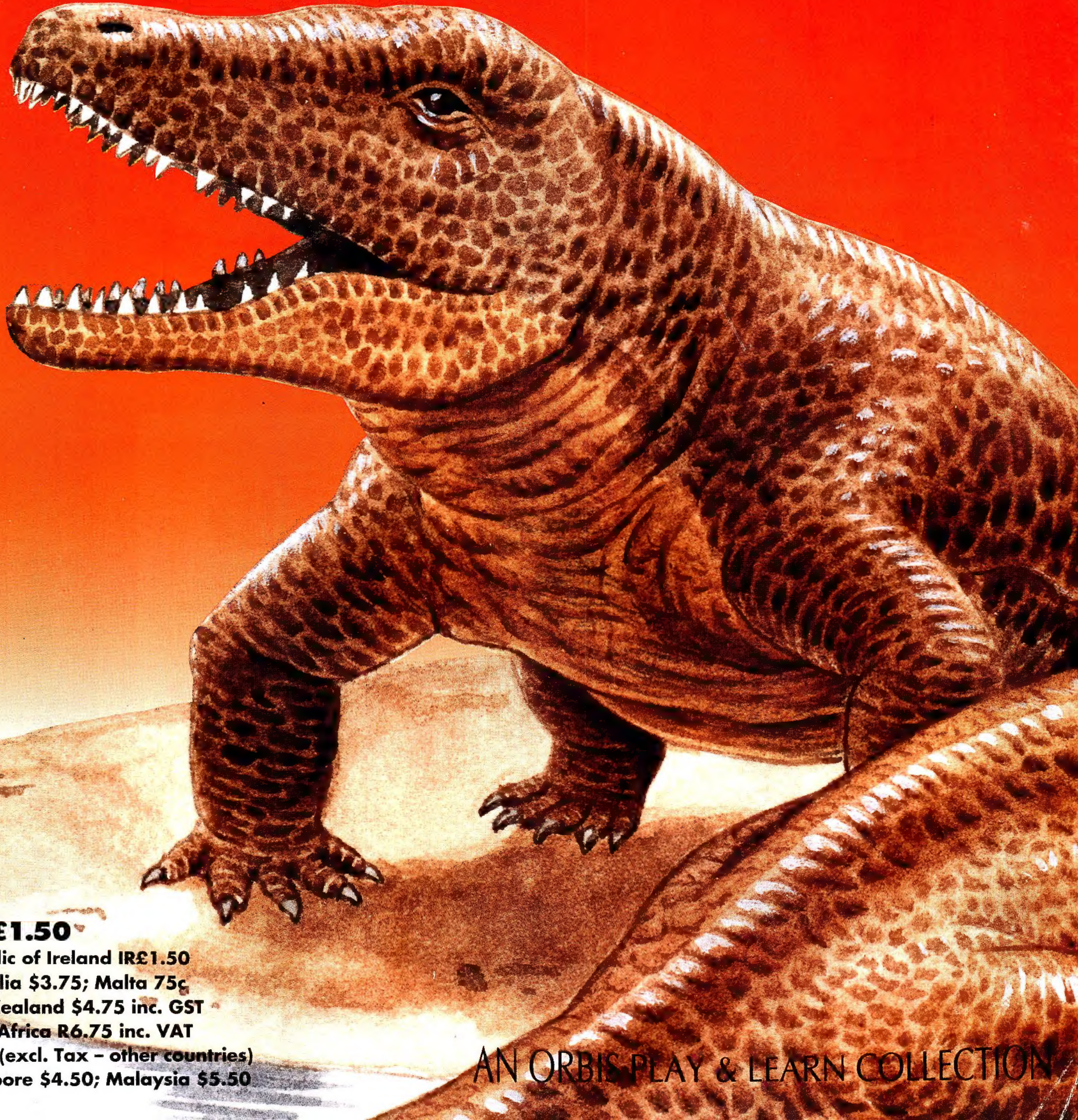

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DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

IDENTIKIT

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DUNKLEOSTEUS

The 'Jaws' of the prehistoric oceans, *Dunkleosteus* was a huge and ferocious predator.

Bloodthirsty *Dunkleosteus* lurked menacingly in seas and oceans, waiting to pounce on its prey. Almost as long as a double-decker bus, this monstrous fish was an underwater terror.

TAIL END

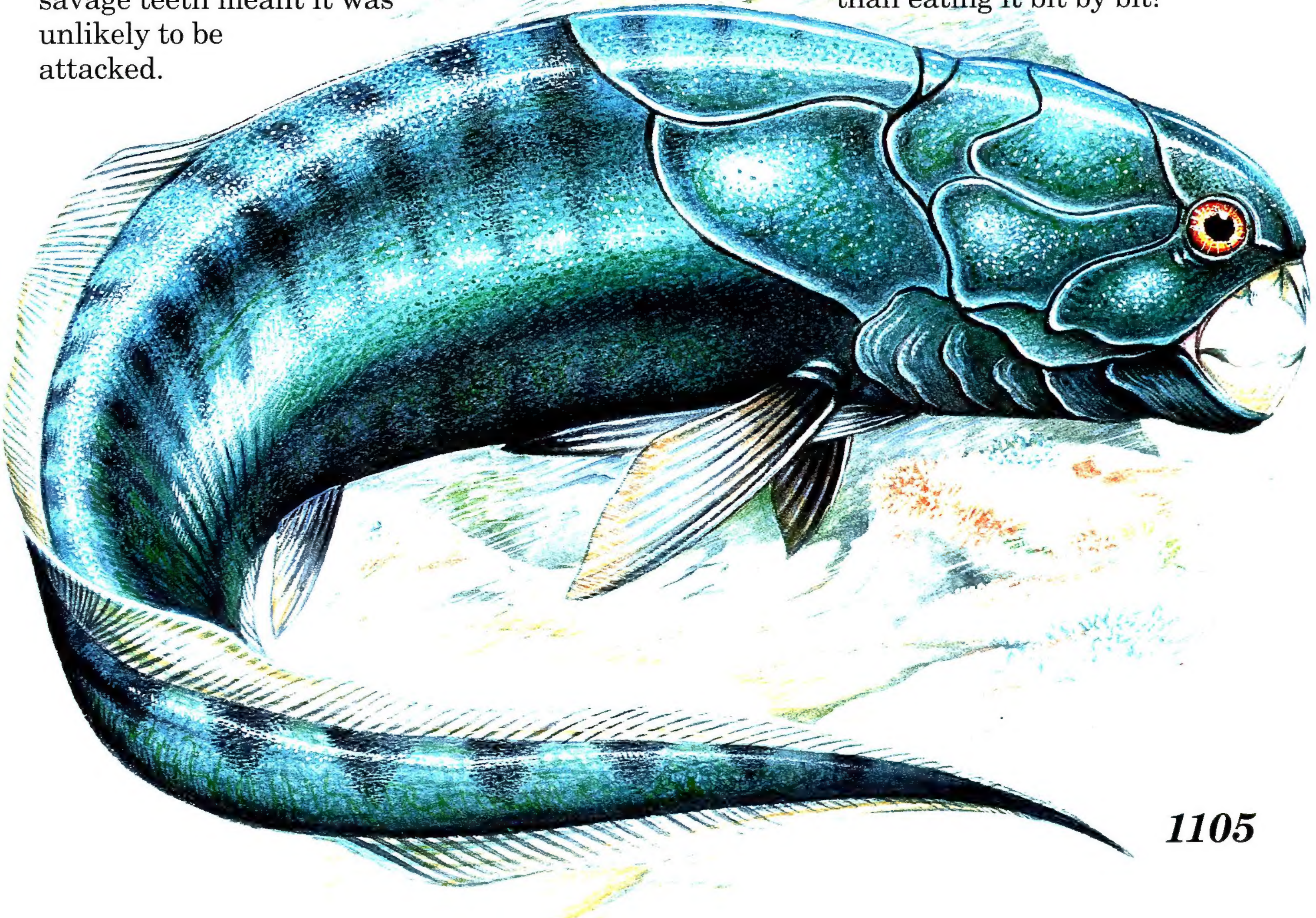
Dunkleosteus' tapering tail end had no armour. But the monster's huge size and savage teeth meant it was unlikely to be attacked.

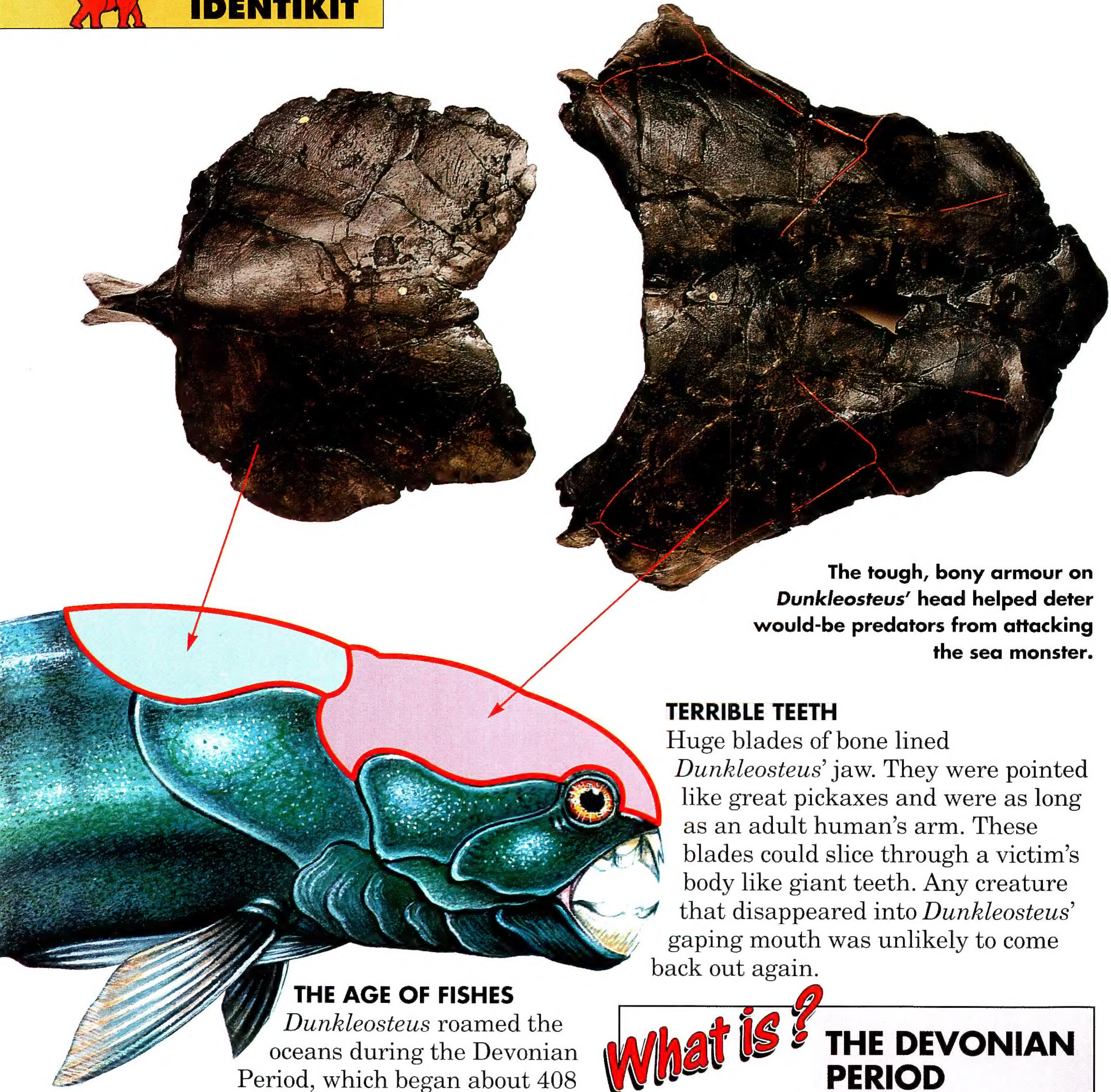
ARMOURED HEAD

The front 3m of *Dunkleosteus*' body was covered with bony armour. As it glided through the sea, searching for its next meal with its big, alert eyes, *Dunkleosteus* was well protected.

JAW DROPPER

Dunkleosteus had a special, moveable joint between its head and body armour. This meant it could lift up its head and open its mouth wide. When it was in striking distance of its prey, *Dunkleosteus* rocked its head back so it could even gobble down large prey in one go, rather than eating it bit by bit!





The tough, bony armour on *Dunkleosteus'* head helped deter would-be predators from attacking the sea monster.

TERRIBLE TEETH

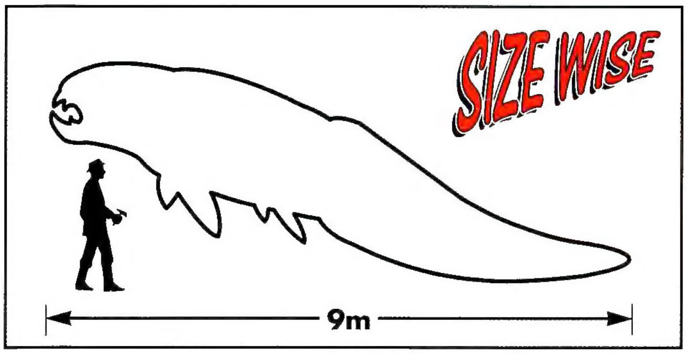
Huge blades of bone lined *Dunkleosteus*' jaw. They were pointed like great pickaxes and were as long as an adult human's arm. These blades could slice through a victim's body like giant teeth. Any creature that disappeared into *Dunkleosteus*' gaping mouth was unlikely to come back out again.

THE AGE OF FISHES

Dunkleosteus roamed the oceans during the Devonian Period, which began about 408 million years ago. Known as the Age of Fishes, it was a time when many different varieties of fish evolved. *Dunkleosteus* was a placoderm, an early group of fish which had jaws and paired fins. Because they had jaws, placoderms were able to attack large prey. A few experts believe that these early, 'plated-skin' fishes were the ancestors of some of today's fish.

What is? THE DEVONIAN PERIOD

The Devonian Period lasted 408–362 million years ago and was named after the old red sandstone and slates in Devon, England. It is called the Age of Fishes because at the time fish were the most common form of life. Towards the end of the Period the first land animals appeared and giant tree ferns formed the world's first forests.



MONSTER FACTS

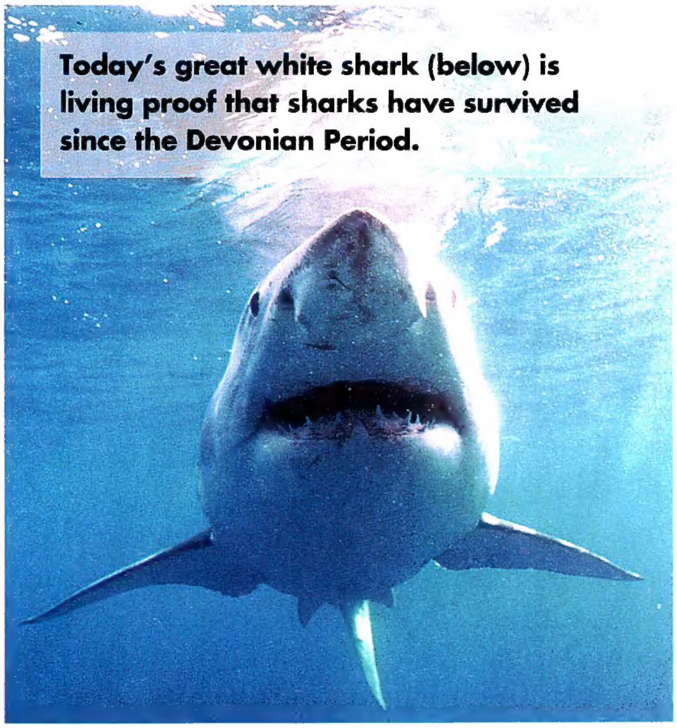
- **NAME:** *Dunkleosteus* (dun-kul-os-tee-us) means 'Dunkle's bones' after D H Dunkle who first described it
- **SIZE:** up to 9m long
- **FOOD:** other fish and sea creatures
- **LIVED:** about 370 million years ago in the Devonian Period in North America and Europe

HUGE APPETITE

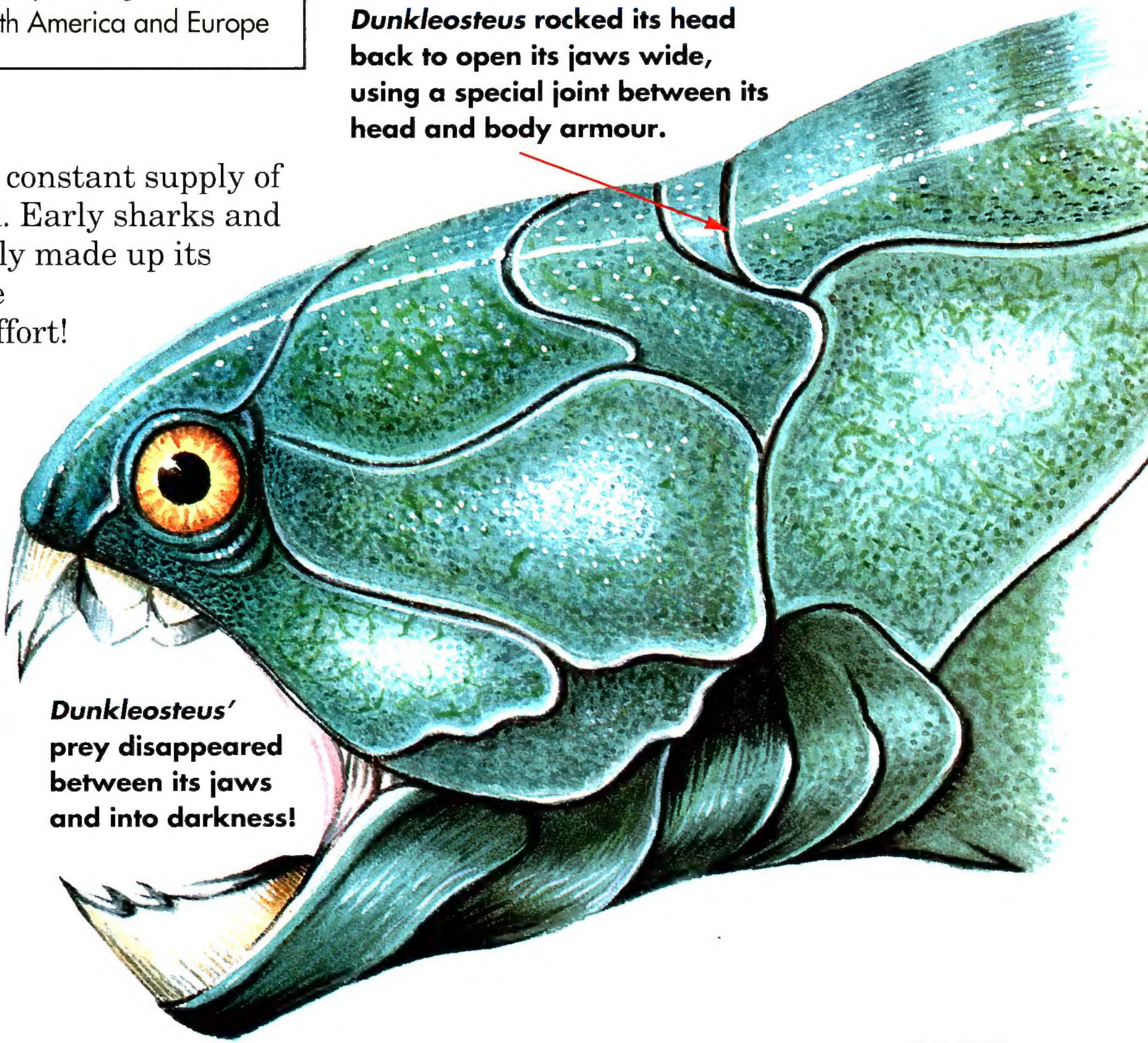
Dunkleosteus needed a constant supply of food to keep it satisfied. Early sharks and other large fish probably made up its favourite diet and were swallowed with little effort!

STIFF COMPETITION

Dunkleosteus was a good hunter, but so were the sharks and bony fishes which began to fill the same seas. *Dunkleosteus* was forced to compete with these 'new' fishes for food. Eventually, *Dunkleosteus* was unable to find enough food to survive.



Today's great white shark (below) is living proof that sharks have survived since the Devonian Period.



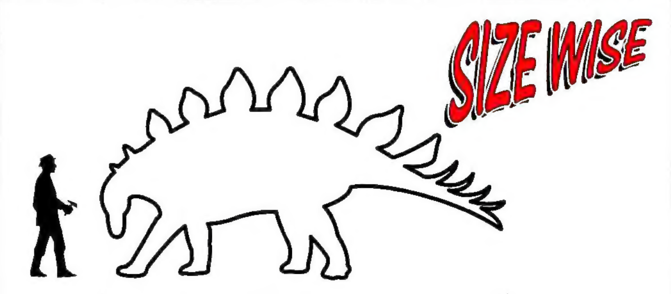
***Dunkleosteus* rocked its head back to open its jaws wide, using a special joint between its head and body armour.**

***Dunkleosteus'* prey disappeared between its jaws and into darkness!**

DACENTRURUS

Armoured *Dacentrurus* was the first stegosaur ever discovered.

When *Dacentrurus'* fossils were first found in England in the 1870s, it was named *Omosaurus*. But, as another dinosaur was already called that, the new dinosaur was renamed *Dacentrurus*. Experts do not know *Dacentrurus'* exact length, but it was probably much longer than a rhinoceros. They have a better idea of its width, as they know its pelvic bone was 1.5m wide.



MONSTER FACTS

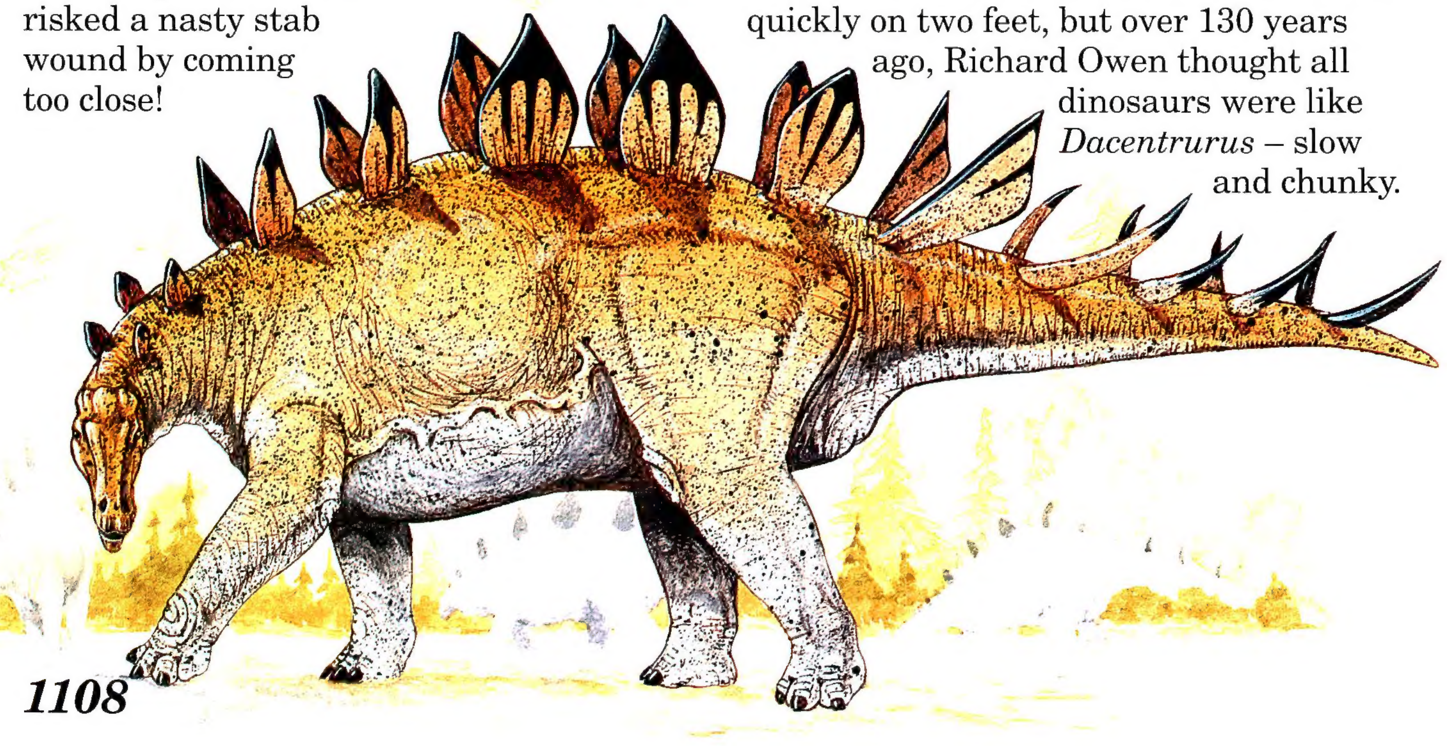
- **NAME:** *Dacentrurus* (da-sen-troo-rus) means 'pointed tail'
- **SIZE:** about 7m long
- **FOOD:** plants
- **LIVED:** about 150 million years ago in the Late Jurassic Period in England, France and Portugal

DOUBLE ROW

Dacentrurus was a slow-moving dinosaur. As it plodded along and bent its little head to nibble at plants on the ground, it might have attracted hungry carnivores. But all along its low back and tail, *Dacentrurus* had a double row of tall spines. These may have helped to deter attackers which risked a nasty stab wound by coming too close!

ALTERED IMAGES

We now know that some dinosaurs moved quickly on two feet, but over 130 years ago, Richard Owen thought all dinosaurs were like *Dacentrurus* – slow and chunky.



SAICHANIA

***Saichania's* name means 'beautiful'. This probably refers to its beautifully-preserved skeleton and not its looks!**

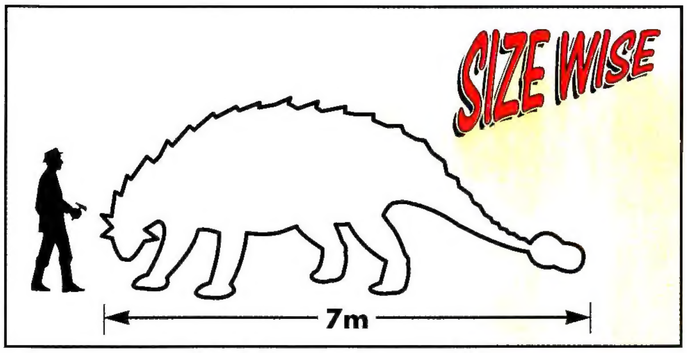
Saichania was longer than an elephant, with a body covered in backward-pointing, triangular spikes. The ankylosaur had a row of spiked half-rings around its neck and a long tail ending with a heavy club.

KNOBBLY SKULL

Saichania's well-preserved skull was found in the Gobi Desert, Mongolia. It was as wide as it was long, with knobbly studs and large horns at the back.

CURVED NOSE BONES

Like mammals, *Saichania* had curved nasal tubes. These may have warmed and moistened the air *Saichania* breathed.

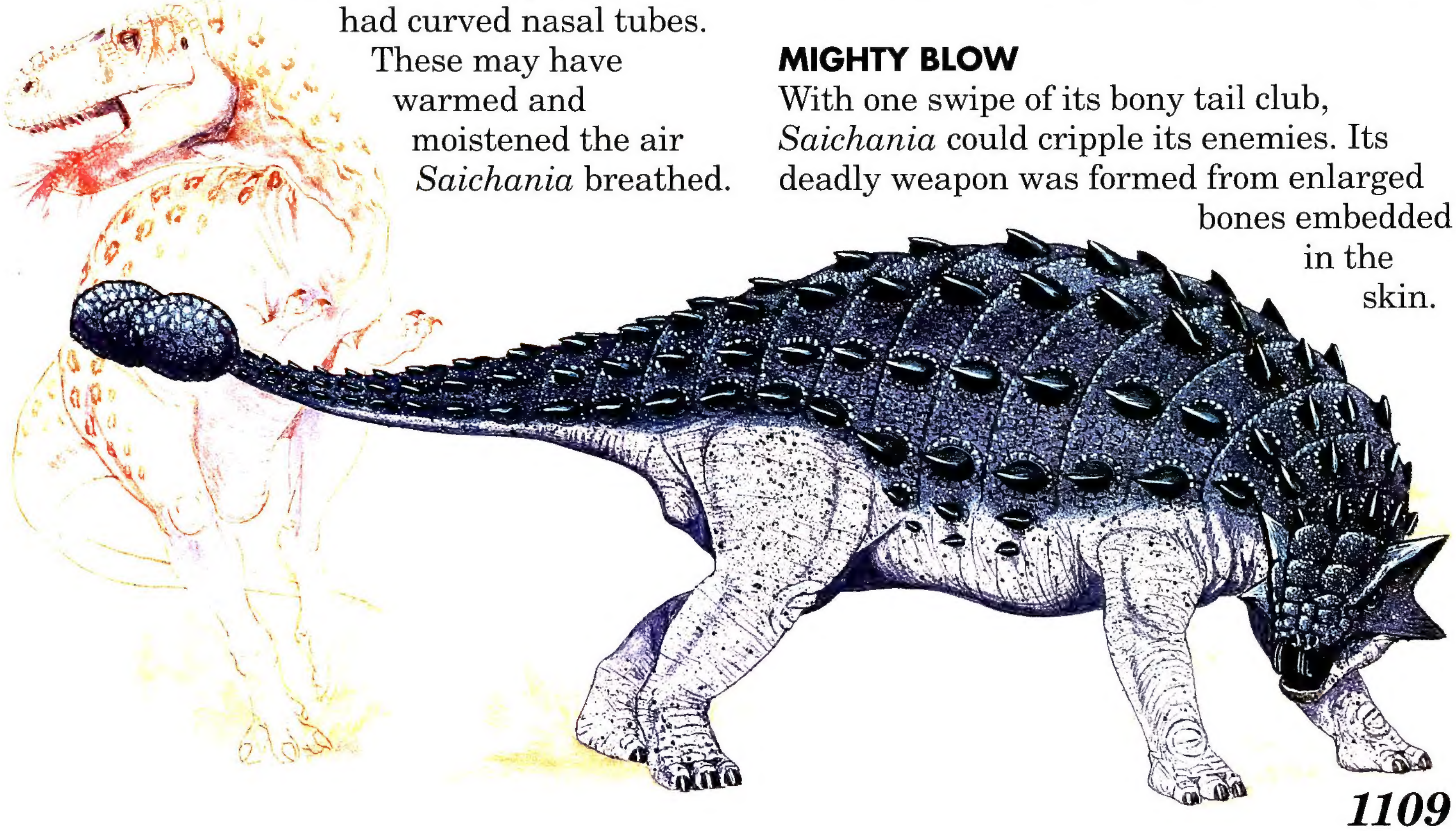


MONSTER FACTS

- **NAME:** *Saichania* (sy-cha-nee-a) means 'beautiful'
- **SIZE:** 7m long
- **FOOD:** plants
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in southern Mongolia

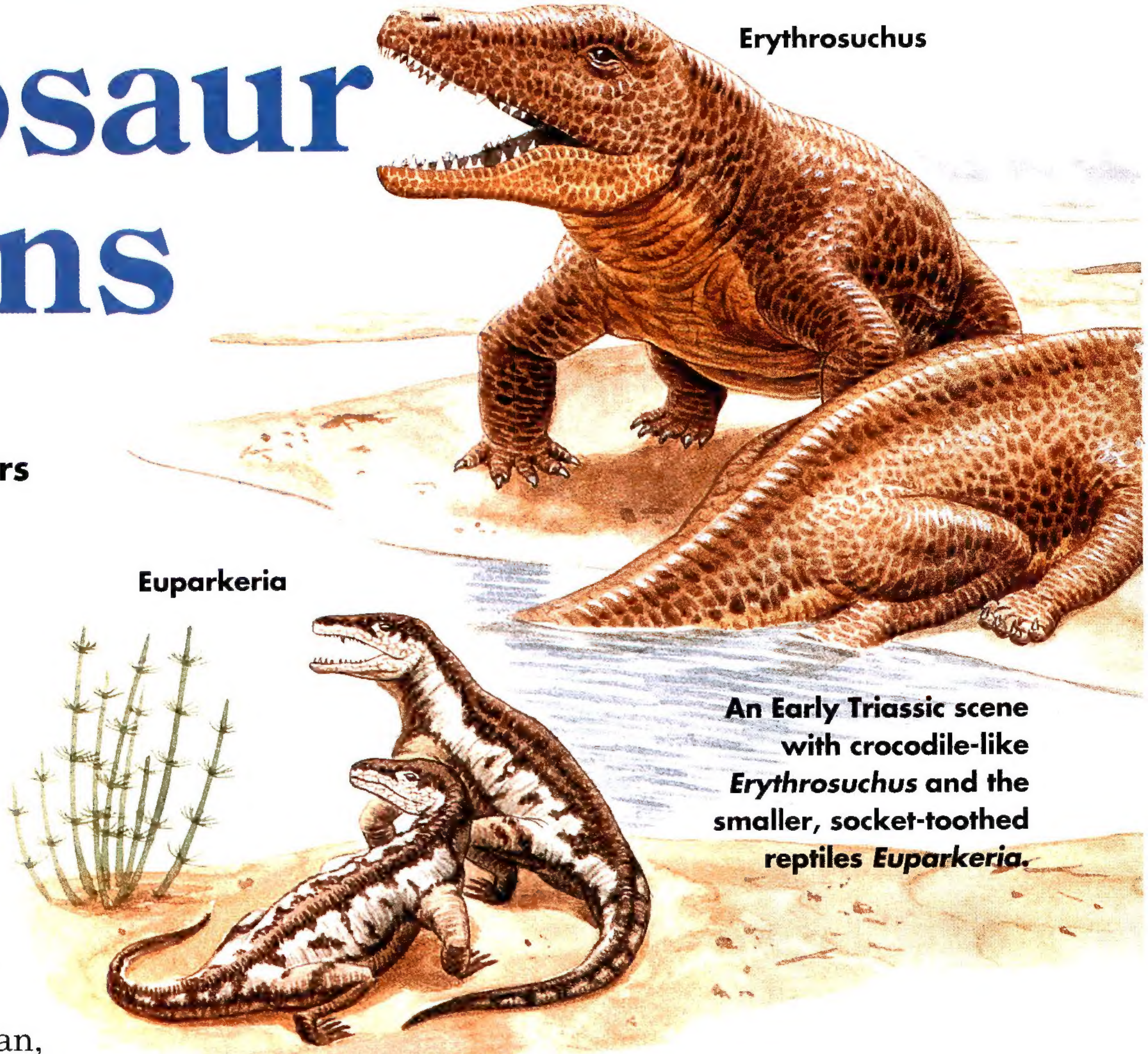
MIGHTY BLOW

With one swipe of its bony tail club, *Saichania* could cripple its enemies. Its deadly weapon was formed from enlarged bones embedded in the skin.



Dinosaur origins

Dinosaurs died out about 66 million years ago. But when did they first appear?



An Early Triassic scene with crocodile-like *Erythrosuchus* and the smaller, socket-toothed reptiles *Euparkeria*.

The first dinosaurs appeared about 225 million years ago, in the Mid Triassic Period.

A CHANGING WORLD

The period before the Triassic was the Permian, when there were already plenty of reptiles around. They included mammal-like reptiles such as *Moschops* and *Dimetrodon*. As the weather got warmer, new plants and animals thrived.

RELATIVE CLUES

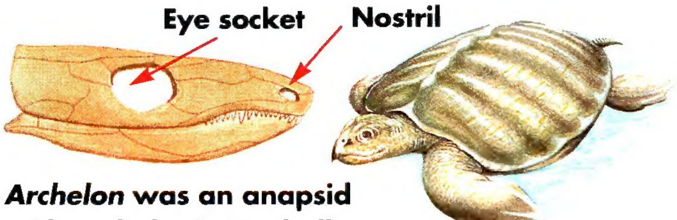
Where did dinosaurs come from? To study their evolution, we need to look at fossil bones. If we can find features that are passed from one group to another, then we can guess which creatures are related.

EMPTY DISCOVERY

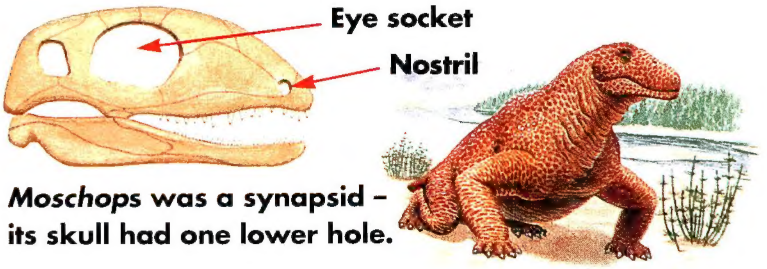
Holes in the skulls of early reptiles provide good clues for finding the first dinosaurs. These holes are windows or spaces in the skull, behind the eyes and in the cheek area.

MUSCLE MECHANISM

Holes made the skull lighter, and left space for strong jaw muscles to contract. Reptiles may have had no holes, a lower hole, upper hole or two holes, on each side of the skull.



***Archelon* was an anapsid with no holes in its skull.**



***Moschops* was a synapsid – its skull had one lower hole.**

WHOLE HEAD

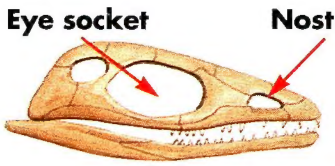
The early reptiles, and their predecessors, the amphibians, had no head-holes. These reptiles, such as the prehistoric turtle *Archelon*, are known as anapsids. They probably swam in the seas using their flippers, and were protected by their hard shells. Today's turtles and tortoises are probably anapsids too.

LOWER HOLE

The mammal-like reptiles which came before true mammals were synapsids. These had a single, lower hole on each side of their head, behind the eye. These mammal-like reptiles dominated life on land for 70 million years, before the dinosaurs appeared.

UPPER HOLE

The euryapsids had a single, upper hole in the skull on each side of their head, behind the eye. They included water-dwelling reptiles like placodonts, nothosaurs and ichthyosaurs.



Euryapsids like *Plesiosaurus* had one upper hole in their skull.

DOUBLE SPACE

The prehistoric lizards and snakes, the mosasaur 'sea-lizards' and a large group called the archosaurs, or 'ruling reptiles', were all diapsids. Their skulls had two holes behind each eye.

SOCKET-TOOTHED REPTILES

About 250 million years ago the thecodonts, or 'socket-toothed' reptiles, spread across the world. The earliest of these were the proterosuchians – crocodile-like animals with squat bodies and legs that sprawled out sideways.

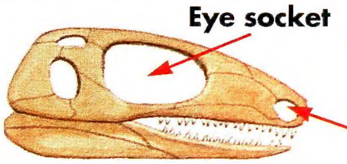
SHRINKING PROCESS

The thecodonts continued to evolve in the Triassic Period. Smaller, lighter creatures emerged, like *Euparkeria*, a slim predator which rose on its hind legs to sprint.

IT'S A FACT

THAT HIPS AND KNEES ARE THE KEY!

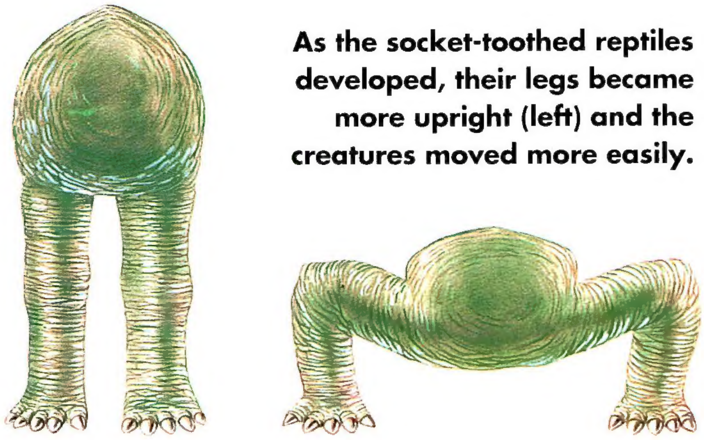
A lizard or crocodile walks with a 'sprawling gait' because its legs bend outwards from the body. The thigh part of the leg sticks out sideways and at the knee, it turns down. But with a dinosaur, it was different! A dinosaur's legs sat under its body – like pillars. It walked with a well-balanced upright gait – like you do. So, dinosaurs moved more easily than other reptiles.



***Pteranodon* was a diapsid with two holes in its skull.**

DINOSAUR LEGS

The next reptiles to emerge were armoured herbivores and a group of flesh-eating crocodile-like creatures. Gradually, these reptiles evolved to look more and more like dinosaurs. One important developing feature was the legs.



As the socket-toothed reptiles developed, their legs became more upright (left) and the creatures moved more easily.

JUST BEFORE DINOSAURS

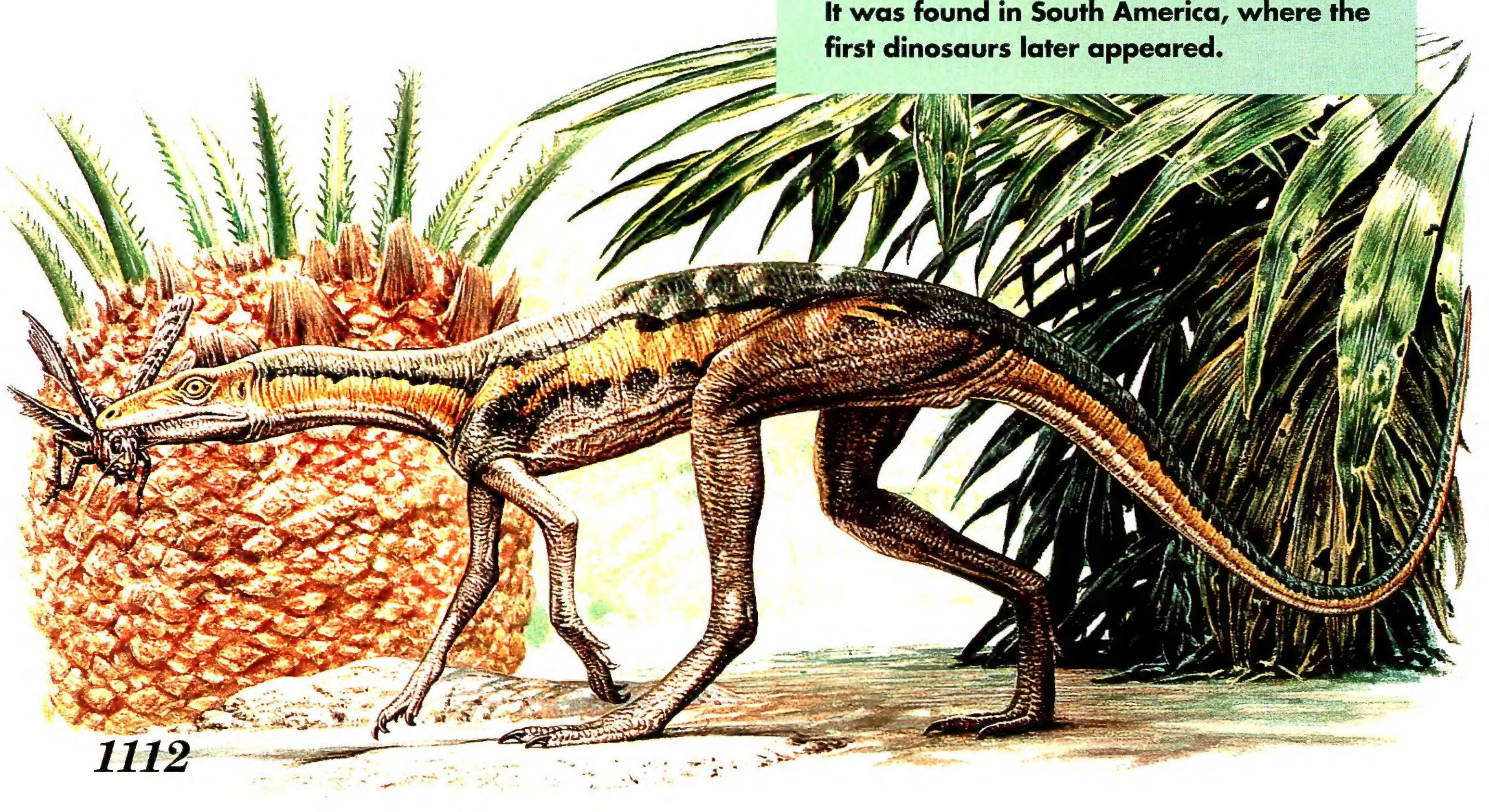
Lagosuchus was a salamander-like creature which lived in the Triassic Period in South America. It looked very like a dinosaur, walking on all fours or rearing up to walk on its two back legs. But the first real dinosaur was still to come.

FIRST DINOSAURS

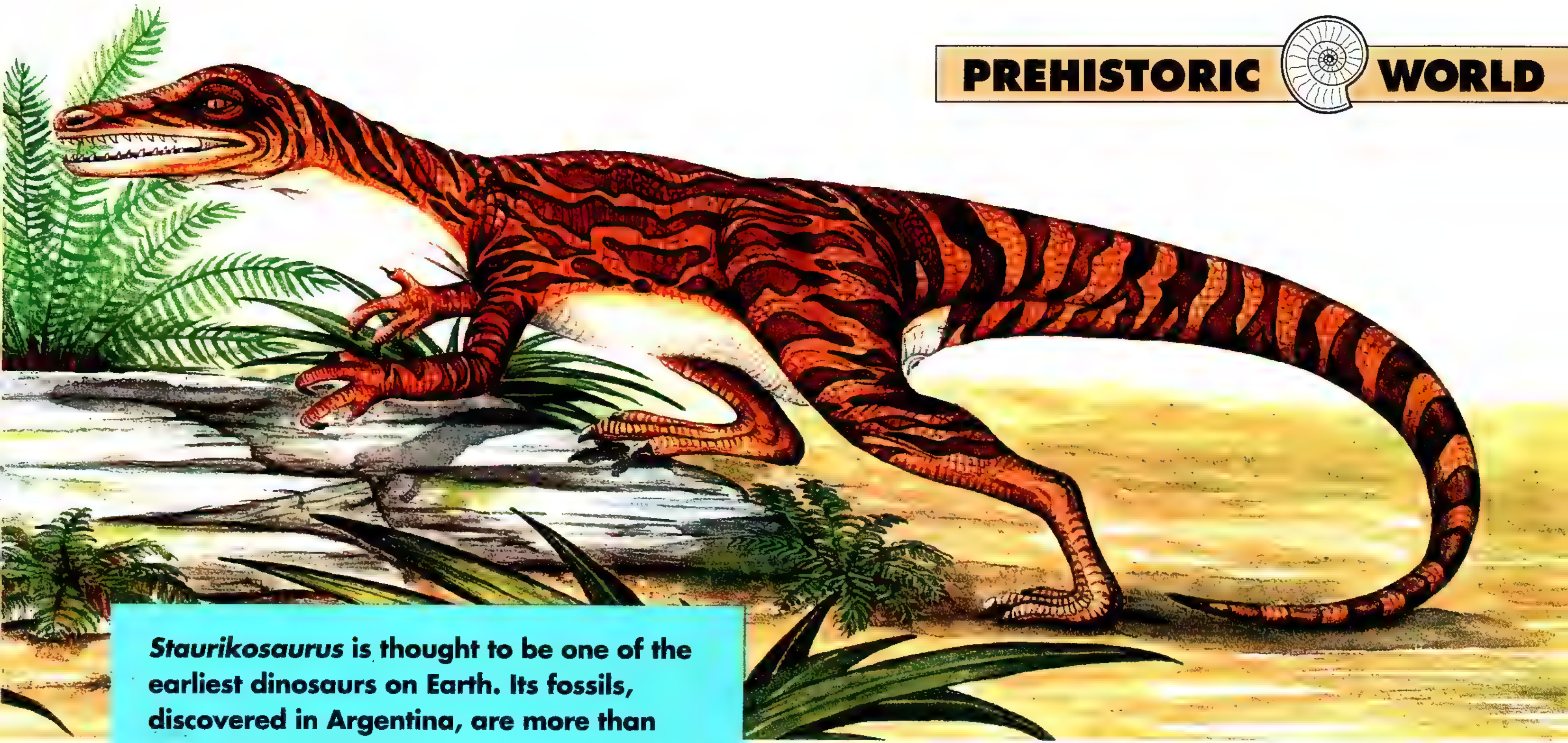
There have been several claims for the 'first dinosaur'. One of the main candidates is *Eoraptor,* a small, meat-eating creature from Argentina. Its fossils were found in 1992 and experts believe it lived for 225 million years. Another possibility is *Staurikosaurus*. Its fossils are over 200 million years old and were also found in Argentina. Dinosaurs probably appeared in South America about 230–220 million years ago, from ancestors resembling *Lagosuchus*. Of course, future fossil-hunters may have different ideas.

DINOSAUR EXPLOSION

Within a few million years, dinosaurs appeared almost everywhere. They developed into two main groups, depending on their hip-bone structure – the lizard-hipped saurischians and the bird-hipped, plant-eating ornithischians. The Age of the Dinosaurs had truly begun!



The salamander-like *Lagosuchus* was one of the first reptiles to resemble a dinosaur. It was found in South America, where the first dinosaurs later appeared.



***Staurikosaurus* is thought to be one of the earliest dinosaurs on Earth. Its fossils, discovered in Argentina, are more than 200 million years old.**

LIZARD HIPS V BIRD HIPS

Early lizard-hipped saurischians included upright, meat-eating theropods like *Coelophysis,* as well as *Plateosaurus* and *Anchisaurus* – ancestors of the huge, barrel-bodied sauropods. Early examples of the bird-hipped ornithischians include small dinosaurs like *Lesothosaurus* and armoured dinosaurs like *Scutellosaurus*.

THE SURVIVORS

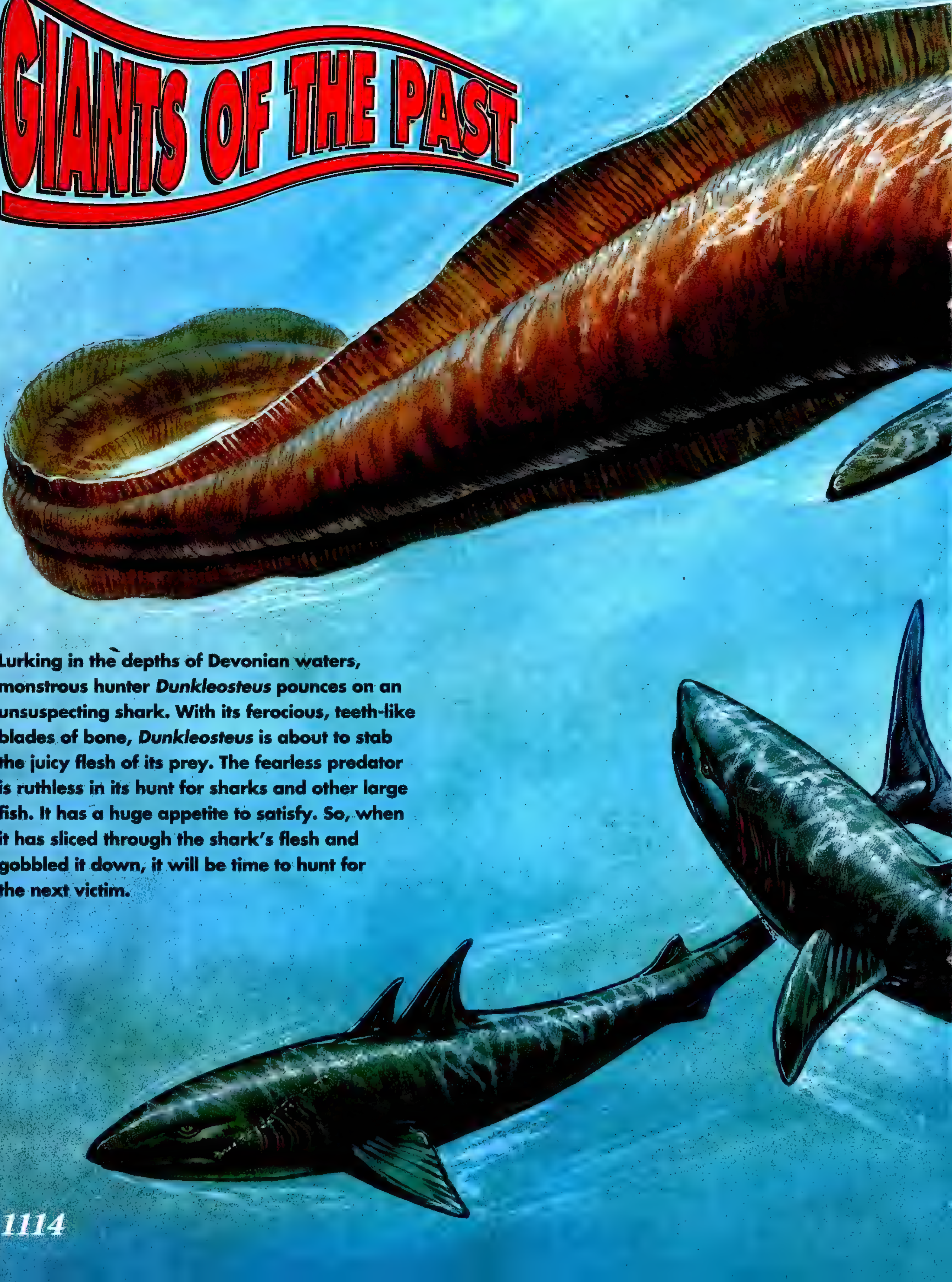
About 205 million years ago, at the beginning of the Jurassic Period, many groups of reptiles died out. Those reptiles that survived included dinosaurs, turtles, plesiosaurs, crocodiles and flying pterosaurs. The first mammals also lived on, but as tiny, shrew-like creatures.

RULERS OF THE LAND

Why was the world ruled by dinosaurs and not by these early reptiles? There are many theories. Firstly, dinosaurs could move quickly and efficiently, so predatory dinosaurs were more successful than other meat-eaters, who starved. Plant-eating dinosaurs were also more successful than their rivals and with their competitors gone, new dinosaurs evolved to take their place. Dinosaurs might also have coped with heat better. But the truth is, we may never know exactly what made them rule.

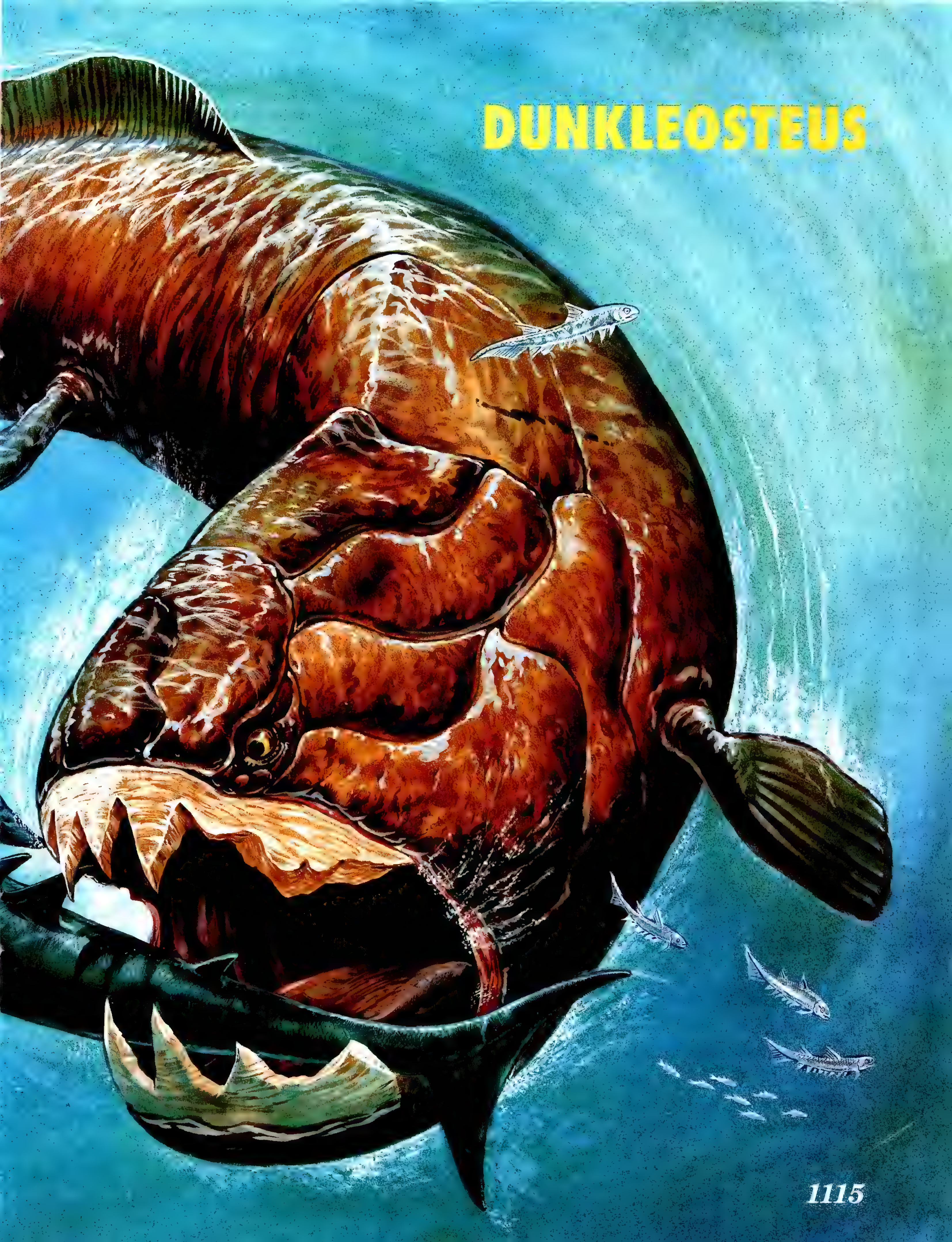
***Proterosuchus* was a crocodile-like animal with a fat, heavy body and short stocky legs sprawling sideways out of its body.**

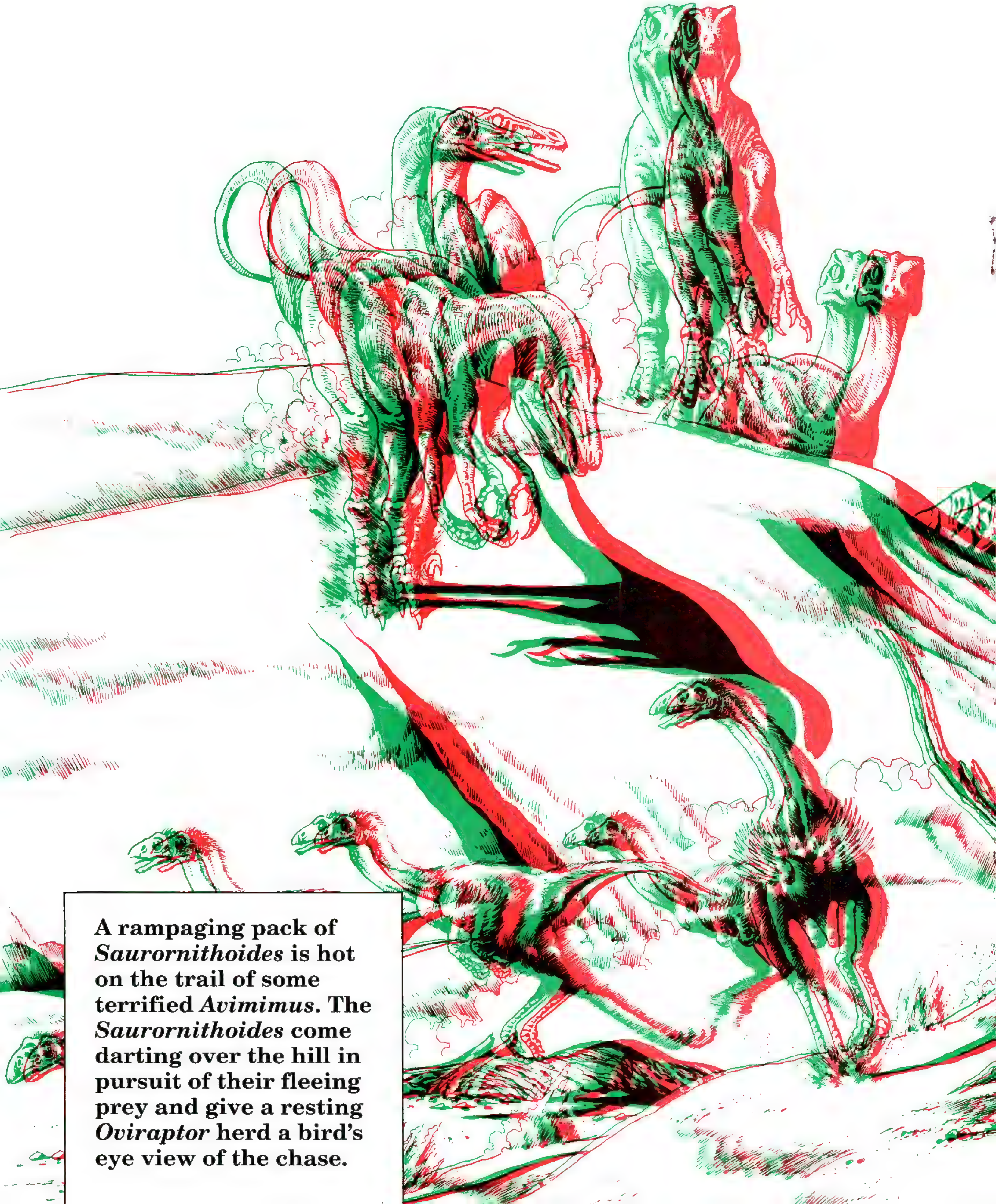
GIANTS OF THE PAST



Lurking in the depths of Devonian waters, monstrous hunter *Dunkleosteus* pounces on an unsuspecting shark. With its ferocious, teeth-like blades of bone, *Dunkleosteus* is about to stab the juicy flesh of its prey. The fearless predator is ruthless in its hunt for sharks and other large fish. It has a huge appetite to satisfy. So, when it has sliced through the shark's flesh and gobbled it down, it will be time to hunt for the next victim.

DUNKLEOSTEUS

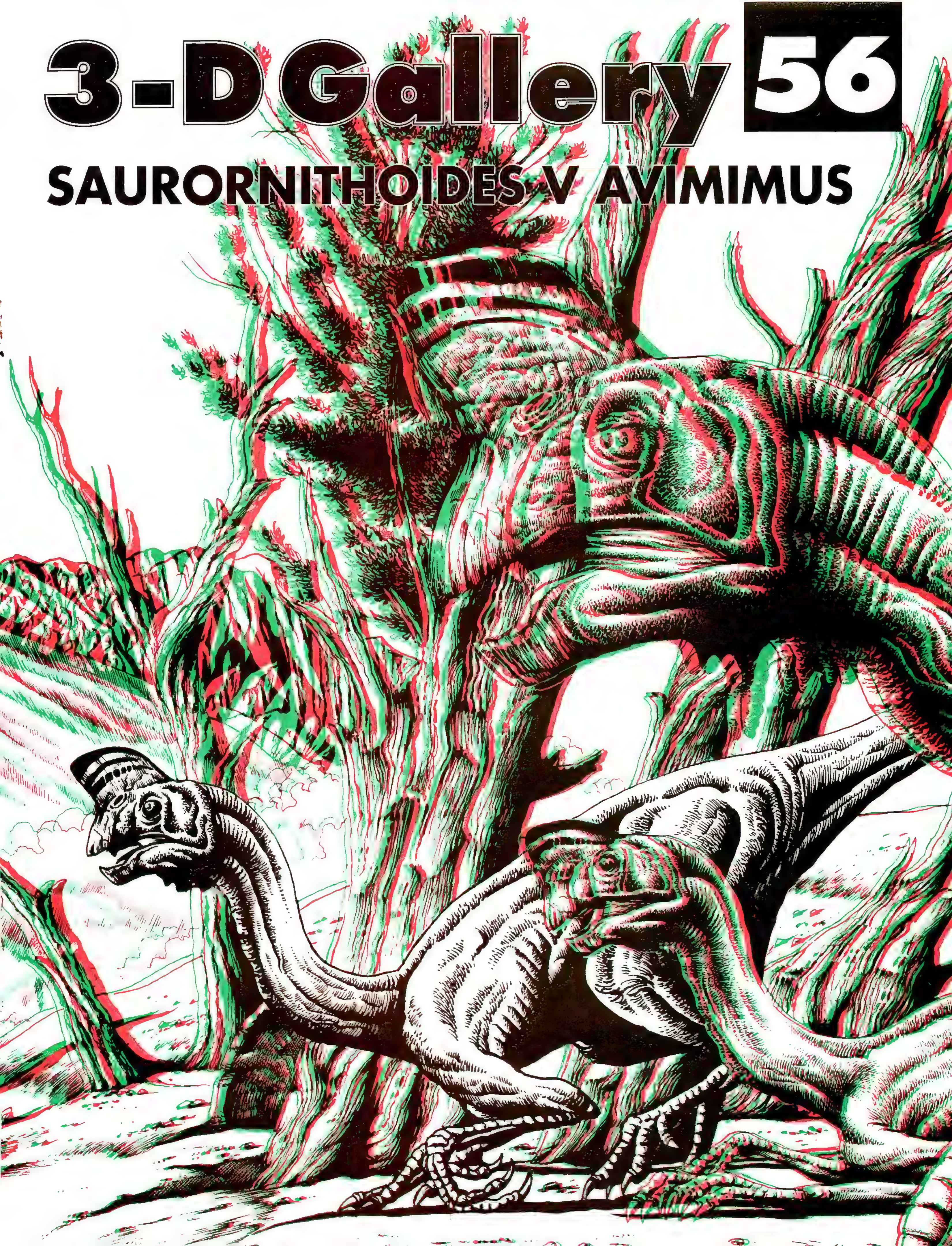




A rampaging pack of *Saurornithoides* is hot on the trail of some terrified *Avimimus*. The *Saurornithoides* come darting over the hill in pursuit of their fleeing prey and give a resting *Oviraptor* herd a bird's eye view of the chase.

3-D Gallery 56

SAURORNITHOIDES V AVIMIMUS



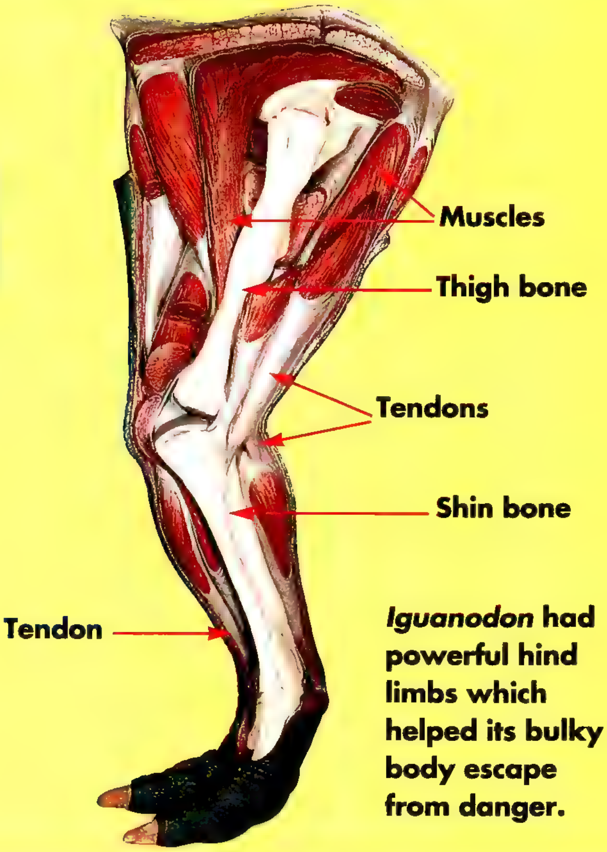
Springs and tendons

Dinosaurs needed more than muscles to help them move around. They had tendons to give them extra spring.

All animals, including humans, need elasticity – the ability to bend and stretch. Try standing up straight with your knees locked and you'll see just how easy it is for someone to push you over! But, if you bend your knees, you're much more stable. The muscles and tendons in your legs help you to bend your knees and to run – the more bounce you have, the faster you go.

TOUGH CORDS

But what exactly is a tendon? A tendon is a strong cord of tissue which attaches muscle to bone. Mammals store what's known as elastic energy in the long tendons of their legs and they use this energy when they want to run and jump.

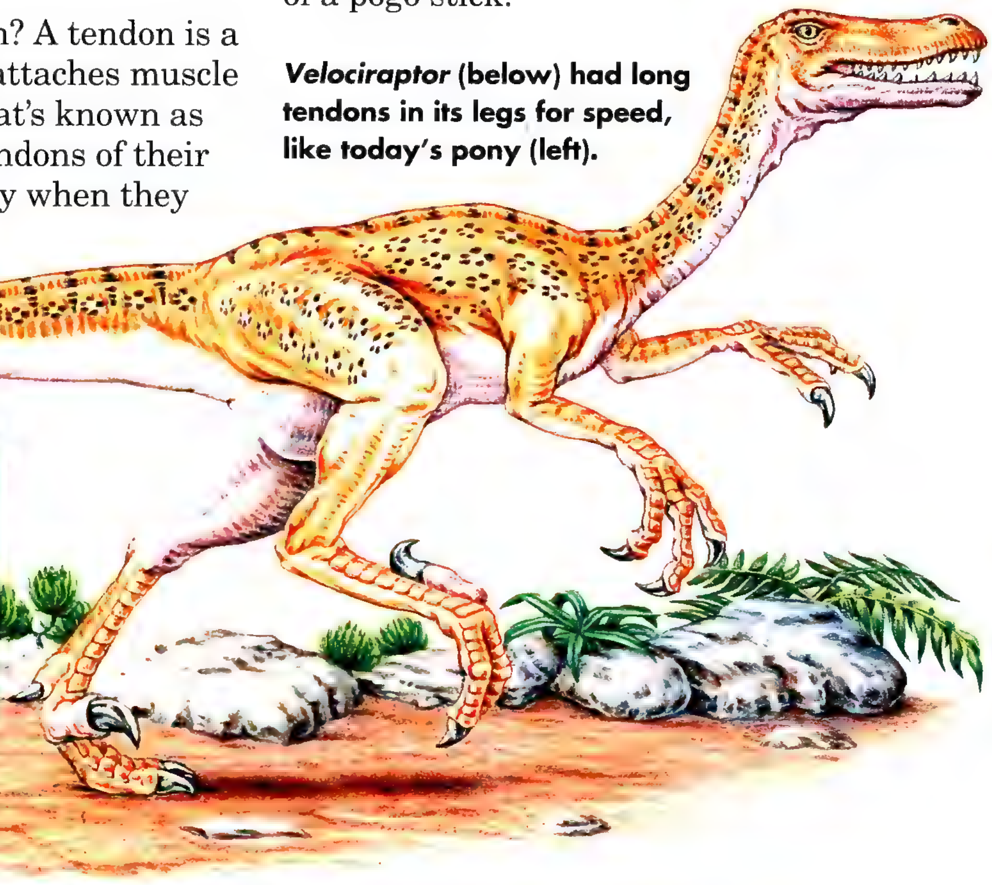


***Iguanodon* had powerful hind limbs which helped its bulky body escape from danger.**

LIKE POGO STICKS

Fast, agile dinosaurs like *Velociraptor* had long tendons in their legs which stretched from their calf muscles through their ankle joints, right down to the soles of their feet. As they bounded along, their tendons would stretch and contract like the spring of a pogo stick.

***Velociraptor* (below) had long tendons in its legs for speed, like today's pony (left).**



HEEL PADS

Even huge dinosaurs like *T rex* and *Allosaurus* had long tendons in their legs to give them bounce. But the plodding sauropods didn't. They stored their elastic energy in thick pads of tissue inside the soles of their feet. This helped them to raise their thick, heavy ankles as they ran.

How can today's huge elephant (right) run so fast? It springs off pads of tissue in its feet, like *Saltasaurus* (below).

BONY TENDONS

Ornithischian dinosaurs, like *Stegosaurus*, had another type of tendon – a bony one, for strength. All the way along their spines, dinosaurs like *Stegosaurus* had long, thin strands of bony tendons which were held at each end by tissue tendons. The strong, bony tendons stopped the backs of these dinosaurs from sagging in the middle.

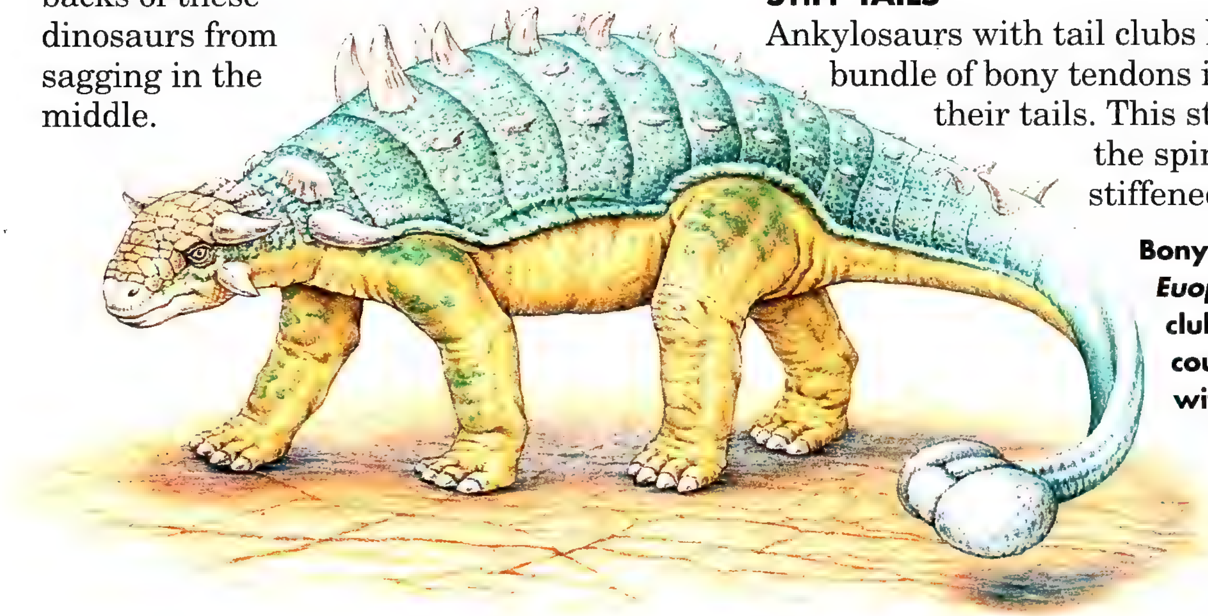
SAFE FROM INJURY

Dinosaurs like *Pachycephalosaurus* had bony tendons in their back and tail to protect them in head-clashing competitions. *Pachycephalosaurus'* strong tendons stopped it suffering a whiplash injury if its head made a sudden jolt.

STIFF TAILS

Ankylosaurs with tail clubs had a tight bundle of bony tendons in the base of their tails. This strengthened the spine and stiffened the tail.

Bony tendons in *Euoplocephalus'* tail club (left) meant it could swipe *T rex* without wrenching its neck or falling over!

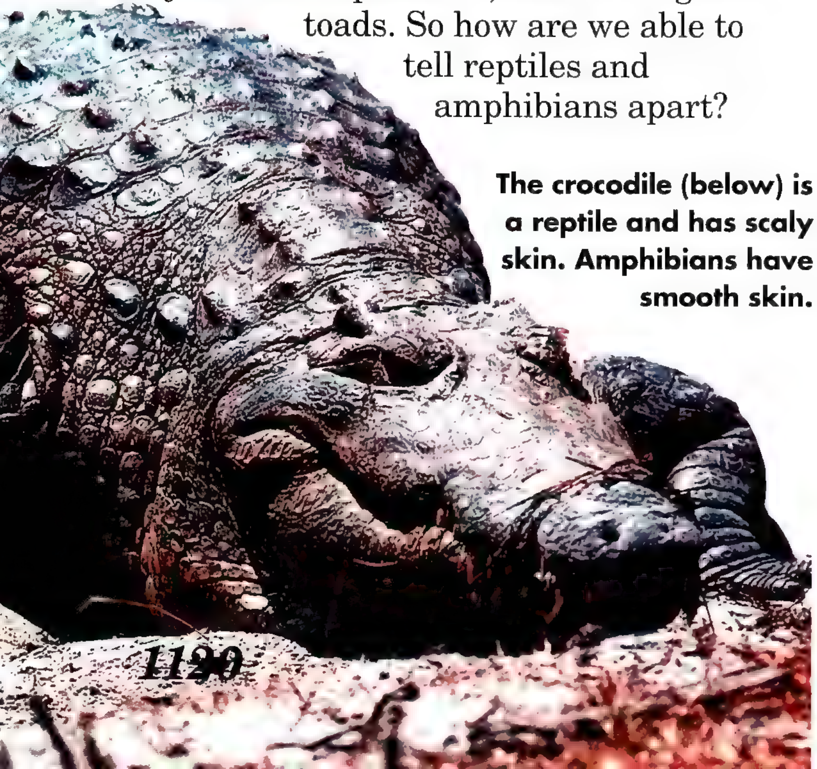


Reptile or amphibian?

If you can tell an amphibian from a reptile, you'll know this salamander is no lizard!

Deciding what is a reptile – especially a prehistoric one – can be difficult. You need to look for certain vital clues.

There are four groups of reptiles alive today. They are snakes and lizards, the crocodile family, turtles and tortoises, and tuatara. Many can live in water or on land, just like amphibians, such as frogs and toads. So how are we able to tell reptiles and amphibians apart?



The crocodile (below) is a reptile and has scaly skin. Amphibians have smooth skin.

LOOKALIKES

At first glance, reptiles and amphibians may look the same. For example, a salamander may be mistaken for a lizard. But a lizard is a reptile and a salamander is an amphibian and we can only tell the difference by taking a closer look.

DIFFERENT SKIN

Reptiles are covered with scales, whereas amphibians have soft, damp skin. Another important difference is that reptiles lay their eggs on land, while most amphibians lay their eggs in water.

SHELLS AND JELLY

A crocodile makes its nest in dry sand or soil and lays hard-shelled eggs, rather like a bird's eggs. Frogs' eggs have no shells, so they are laid in water in a protective jelly-like cluster, called frogspawn.

Most amphibians lay their eggs in water. The frogs' eggs here have no protective shell.

WEAK AND STRONG

Experts can also tell reptiles and amphibians apart by looking at their skeletons. Reptiles have to lift their bodies off the ground when they walk, so they need a strong skeleton to support them. But amphibians generally have a weak skull and a fish-like skeleton. In fact, salamanders and newts look rather like wriggling fishes when they walk.

PREHISTORIC PUZZLE

So, by looking closely at today's reptiles and amphibians we can soon tell them apart. But it is much more difficult to decide what was a reptile and what was an amphibian many millions of years ago in prehistoric times.

DISAPPEARING CLUES

Skin and scales rot away quickly and few eggs have survived. Experts have to rely on fossil bones and the rocks they were found in.

EARLY ANCESTORS

By carefully studying the clues available, not only have scientists been able to identify the earliest ancestors of today's reptiles and amphibians, they have also worked out how the creatures lived and even what they ate.

IT'S A FACT

COOL CUSTOMERS

Amphibians and reptiles are cold-blooded creatures. They are most active when their bodies are warmed by the sun. At night, or in cold weather, they slow down.

Reptiles, like the tortoise, lay their eggs on land. The eggs are protected by a shell, like those of a bird.

RISE OF THE REPTILES

The first reptiles evolved from amphibians. The earliest known amphibian was *Ichthyostega*, which lived in the Devonian Period, around 370 million years ago. About 1m long, *Ichthyostega* evolved from a fish. Its skull and tail were very fish-like and it even had some fish-like scales. It moved about easily in water and was able to walk on land, if rather awkwardly.

DEEP IN THE FOREST

The earliest reptiles appeared around 340 million years ago. Just like lizards, snakes and turtles today, they could lay their eggs away from water. One of the first reptiles was *Hylonomus*, which lived in the Late Carboniferous Period. It darted about in the hot, swampy forests which covered most of the land. Small and quick, it looked and behaved very like a modern lizard.

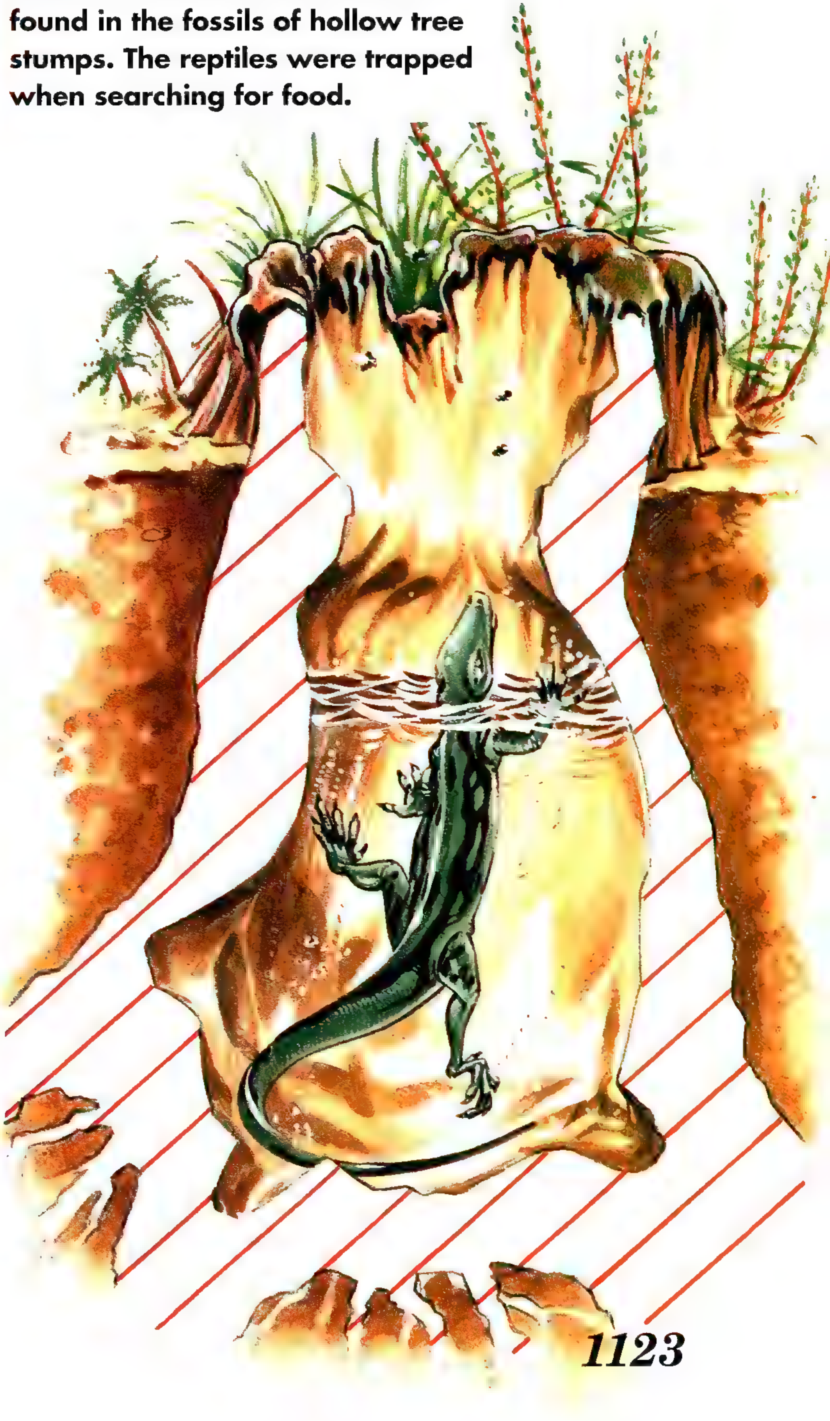
Ichthyostega **(above) was the earliest amphibian and arrived on Earth long before the reptiles.**

Hylonomus **(below) was one of the first reptiles. It could lay its eggs on land.**

Is it true that giant trees grew in the Carboniferous Period?

Yes, the trees that *Hylonomus* lived under were enormous. They were the ancestors of today's tiny clubmoss, as well as ferns and horsetails. These prehistoric trees towered to heights of 30m in the Carboniferous Period.

Prehistoric *Hylonomus* (below) is largely known from skeletons found in the fossils of hollow tree stumps. The reptiles were trapped when searching for food.



TRAPPED IN A TRUNK

Several *Hylonomus* skeletons were preserved in an unusual way – deep inside the fossilized remains of hollow tree stumps. Experts believe *Hylonomus* probably fed on insects and snails which lived in the rotting roots of trees. While hunting, some of these reptiles may have fallen into hollow stumps full of water.

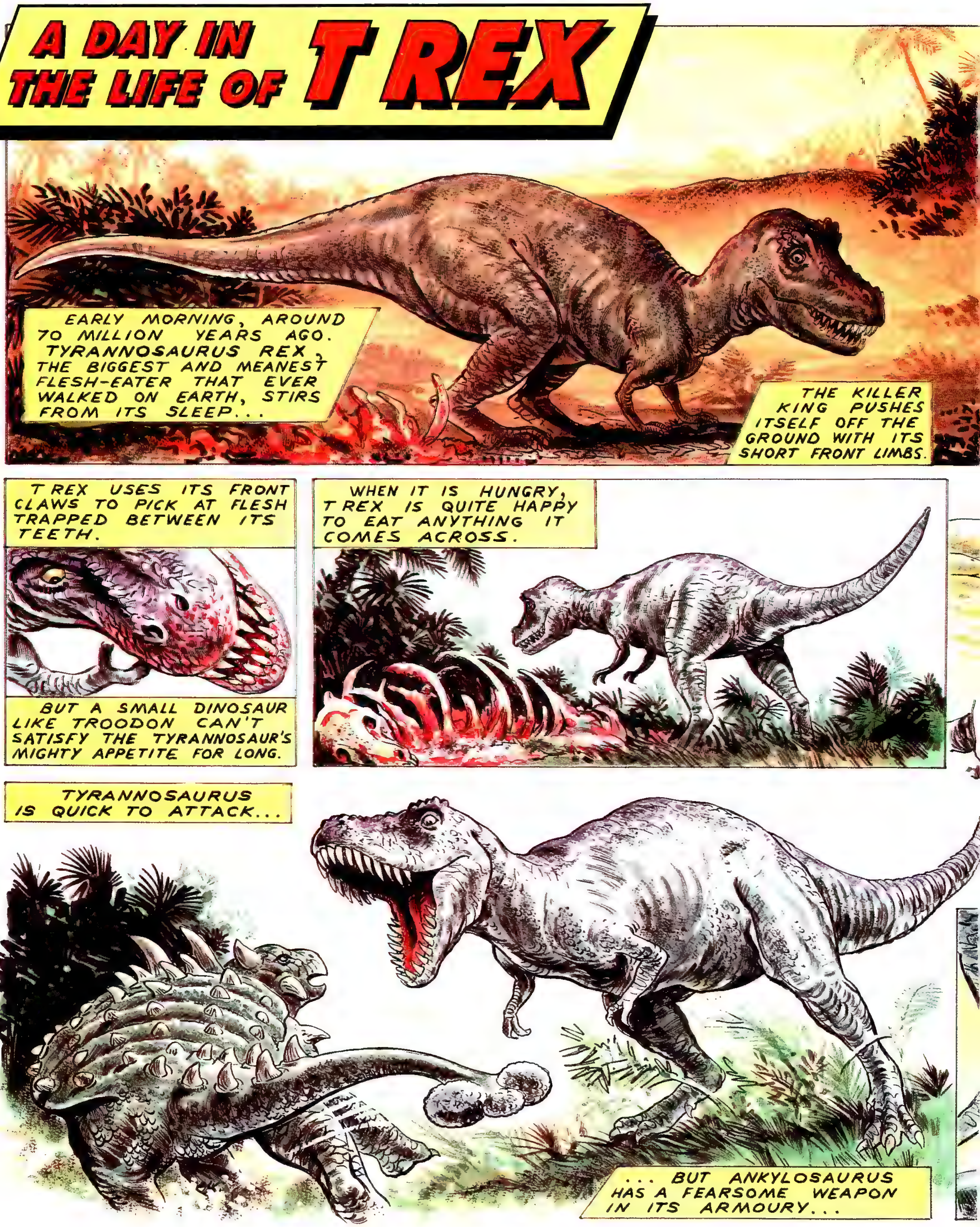
SNAPPING TEETH

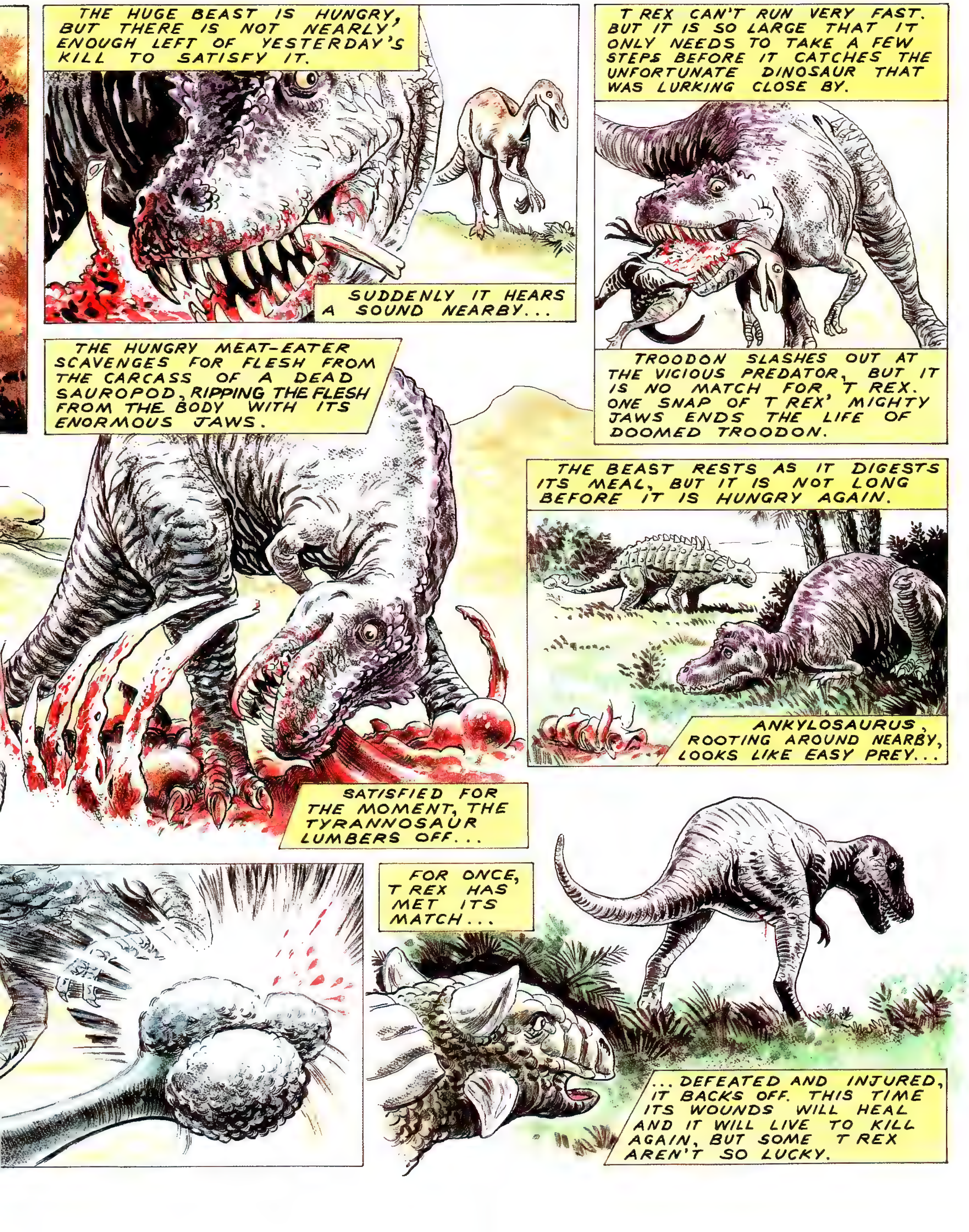
Hylonomus was one of the smallest prehistoric reptiles. It was only 20cm long, about the same size as a fully-grown human hand. Like today's small lizards, *Hylonomus* snapped up insects. It would have crushed them with its sharp teeth.

SKULL SHAPE

Early reptiles like *Hylonomus* had very simple skulls. These were like heavy, solid boxes of bone, with openings for the eyes and nostrils. Later reptiles have more complicated skulls, as well as more powerful jaws.

A DAY IN THE LIFE OF T REX

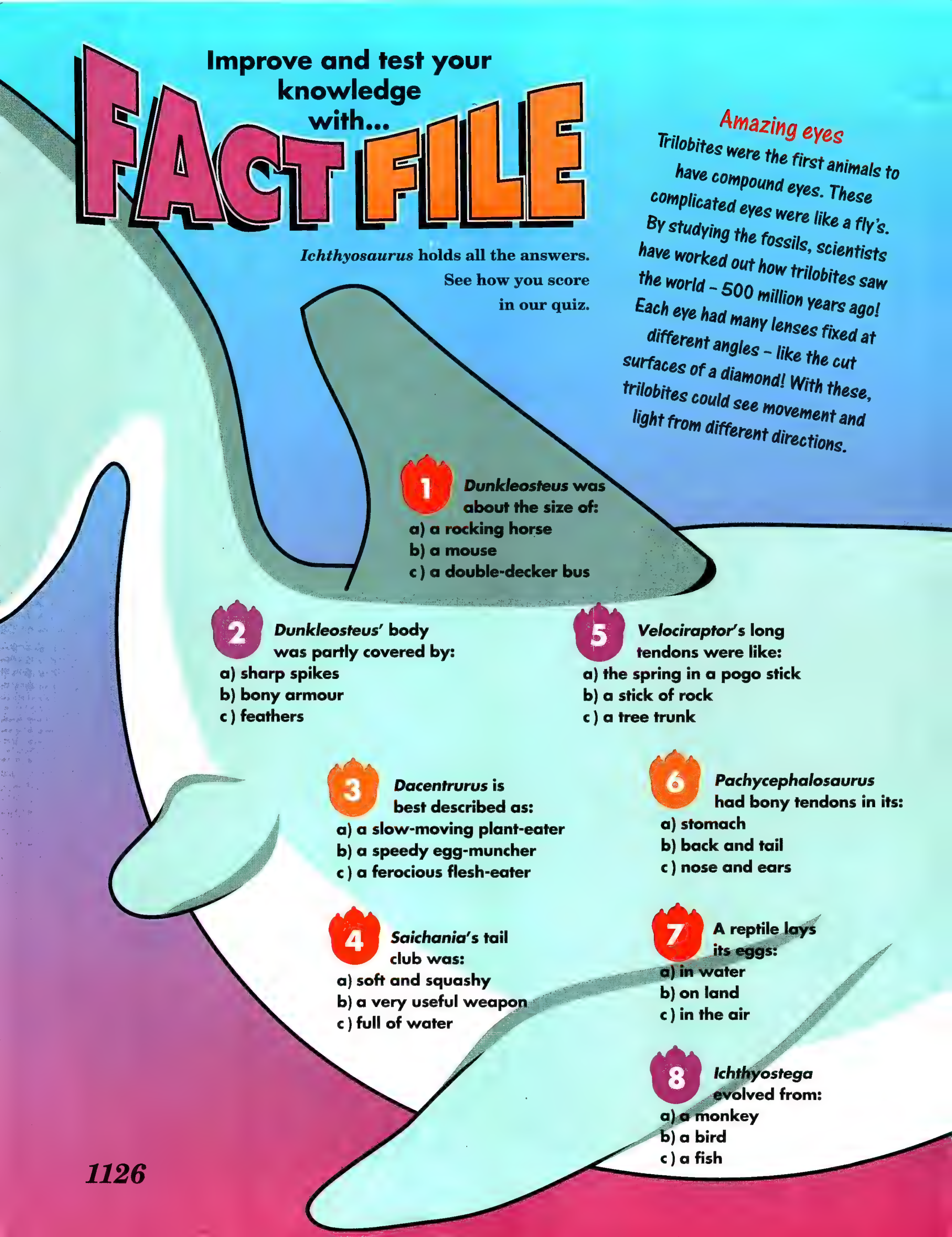

EARLY MORNING, AROUND 70 MILLION YEARS AGO. TYRANNOSAURUS REX, THE BIGGEST AND MEANEST FLESH-EATER THAT EVER WALKED ON EARTH, STIRS FROM ITS SLEEP...
THE KILLER KING PUSHES ITSELF OFF THE GROUND WITH ITS SHORT FRONT LIMBS.
T REX USES ITS FRONT CLAWS TO PICK AT FLESH TRAPPED BETWEEN ITS TEETH.
BUT A SMALL DINOSAUR LIKE TROODON CAN'T SATISFY THE TYRANNOSAUR'S MIGHTY APPETITE FOR LONG.
WHEN IT IS HUNGRY, T REX IS QUITE HAPPY TO EAT ANYTHING IT COMES ACROSS.
TYRANNOSAURUS IS QUICK TO ATTACK...
... BUT ANKYLOSAURUS HAS A FEARSOME WEAPON IN ITS ARMOURY...


THE HUGE BEAST IS HUNGRY, BUT THERE IS NOT NEARLY ENOUGH LEFT OF YESTERDAY'S KILL TO SATISFY IT.
SUDDENLY IT HEARS A SOUND NEARBY...
T REX CAN'T RUN VERY FAST. BUT IT IS SO LARGE THAT IT ONLY NEEDS TO TAKE A FEW STEPS BEFORE IT CATCHES THE UNFORTUNATE DINOSAUR THAT WAS LURKING CLOSE BY.
TROODON SLASHES OUT AT THE VICIOUS PREDATOR, BUT IT IS NO MATCH FOR T REX. ONE SNAP OF T REX' MIGHTY JAWS ENDS THE LIFE OF DOOMED TROODON.
THE HUNGRY MEAT-EATER SCAVENGES FOR FLESH FROM THE CARCASS OF A DEAD SAUROPOD, RIPPING THE FLESH FROM THE BODY WITH ITS ENORMOUS JAWS.
SATISFIED FOR THE MOMENT, THE TYRANNOSAUR LUMBERS OFF...
THE BEAST RESTS AS IT DIGESTS ITS MEAL, BUT IT IS NOT LONG BEFORE IT IS HUNGRY AGAIN.
ANKYLOSAURUS, ROOTING AROUND NEARBY, LOOKS LIKE EASY PREY...
FOR ONCE, T REX HAS MET ITS MATCH...
...DEFEATED AND INJURED, IT BACKS OFF. THIS TIME ITS WOUNDS WILL HEAL AND IT WILL LIVE TO KILL AGAIN, BUT SOME T REX AREN'T SO LUCKY.

Improve and test your knowledge with...

FACT FILE

Ichthyosaurus holds all the answers. See how you score in our quiz.



Amazing eyes

Trilobites were the first animals to have compound eyes. These complicated eyes were like a fly's. By studying the fossils, scientists have worked out how trilobites saw the world – 500 million years ago! Each eye had many lenses fixed at different angles – like the cut surfaces of a diamond! With these, trilobites could see movement and light from different directions.

1 ***Dunkleosteus*** **was about the size of:**
- a) a rocking horse
- b) a mouse
- c) a double-decker bus

2 ***Dunkleosteus'*** **body was partly covered by:**
- a) sharp spikes
- b) bony armour
- c) feathers

3 ***Dacentrurus*** **is best described as:**
- a) a slow-moving plant-eater
- b) a speedy egg-muncher
- c) a ferocious flesh-eater

4 ***Saichania*****'s tail club was:**
- a) soft and squashy
- b) a very useful weapon
- c) full of water

5 ***Velociraptor*****'s long tendons were like:**
- a) the spring in a pogo stick
- b) a stick of rock
- c) a tree trunk

6 ***Pachycephalosaurus*** **had bony tendons in its:**
- a) stomach
- b) back and tail
- c) nose and ears

7 **A reptile lays its eggs:**
- a) in water
- b) on land
- c) in the air

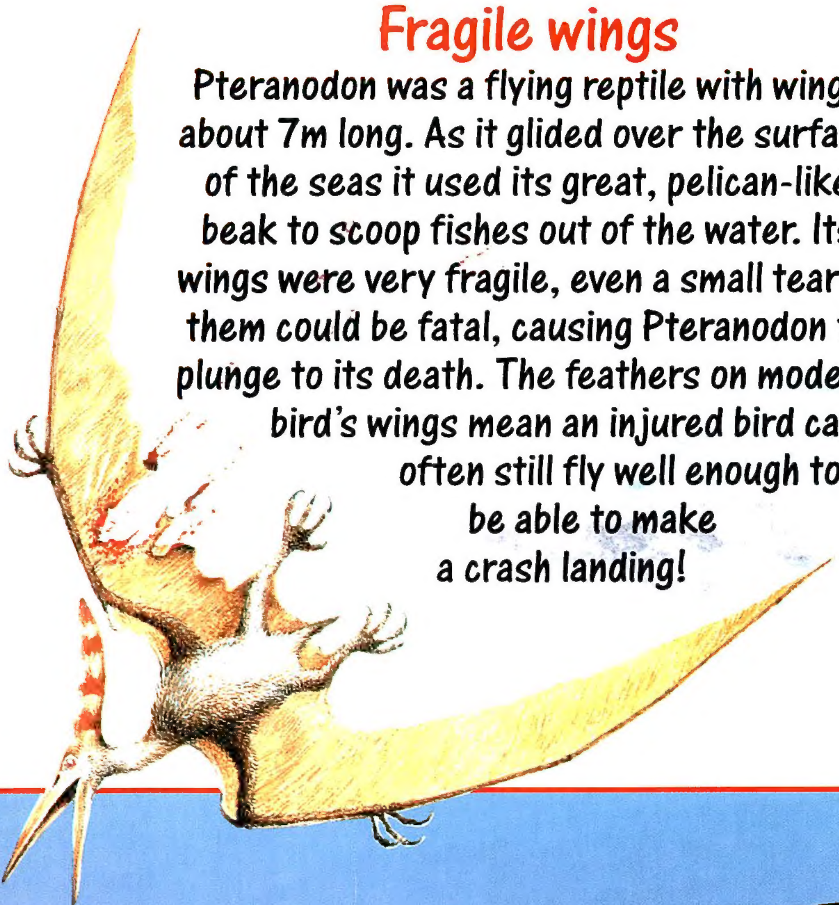
8 ***Ichthyostega*** **evolved from:**
- a) a monkey
- b) a bird
- c) a fish

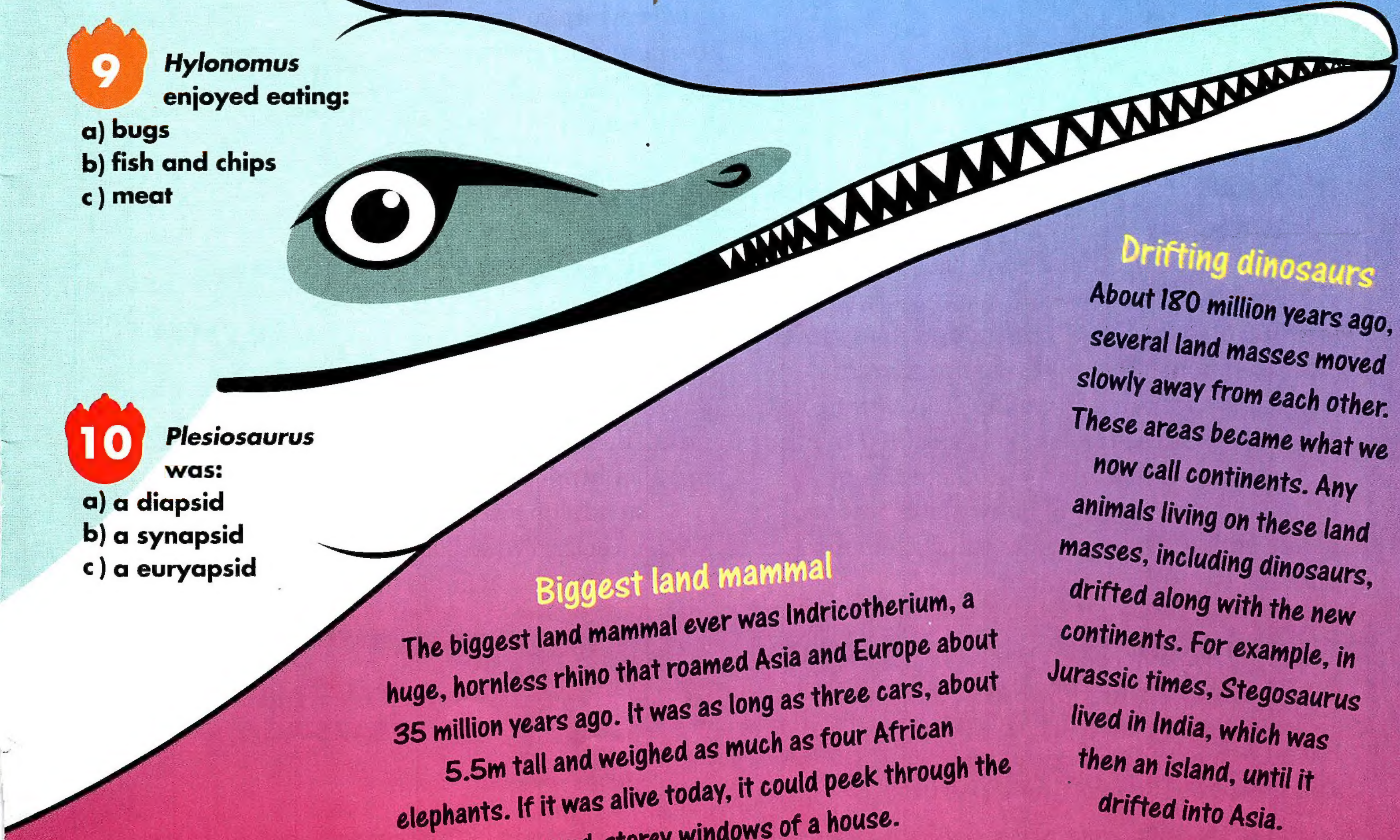
No hump camel

Camels first lived about 10 million years ago. Alticamelus was a bit like a giraffe, with a long neck to reach leaves high up in the trees. Stenomylus was much smaller – about the size of a deer with slim legs. It could run fast and browsed on low vegetation. Unlike camels today, neither creature had a hump! Perhaps early camels didn't live in deserts so they didn't need a hump to store fat and fluid in on long journeys.

Fragile wings

Pteranodon was a flying reptile with wings about 7m long. As it glided over the surface of the seas it used its great, pelican-like beak to scoop fishes out of the water. Its wings were very fragile, even a small tear in them could be fatal, causing Pteranodon to plunge to its death. The feathers on modern bird's wings mean an injured bird can often still fly well enough to be able to make a crash landing!





9 ***Hylonomus*** **enjoyed eating:**

- **a) bugs**
- **b) fish and chips**
- **c) meat**

10 ***Plesiosaurus*** **was:**

- **a) a diapsid**
- **b) a synapsid**
- **c) a euryapsid**

Drifting dinosaurs

About 180 million years ago, several land masses moved slowly away from each other. These areas became what we now call continents. Any animals living on these land masses, including dinosaurs, drifted along with the new continents. For example, in Jurassic times, Stegosaurus lived in India, which was then an island, until it drifted into Asia.

Biggest land mammal

The biggest land mammal ever was Indricotherium, a huge, hornless rhino that roamed Asia and Europe about 35 million years ago. It was as long as three cars, about 5.5m tall and weighed as much as four African elephants. If it was alive today, it could peek through the second-storey windows of a house.

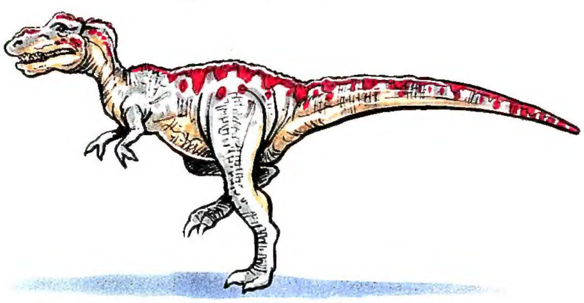
Answers to the questions on inside back cover

A to Z OF DINOSAURS

TA – TH

TARBOSAURUS **70 MYA**

Tarbosaurus (tar-boh-saw-rus) was a ferocious predator, as long as three cars. Although it looked very like *T rex*, *Tarbosaurus* lived thousands of miles away from its North American relative, in Mongolia and China. It had a huge head with dagger-like fangs. *Tarbosaurus* walked on two legs and had the smallest arms of any predatory dinosaur. Its name means 'alarming dinosaur'.



TARCHIA **75 MYA**

Originally, only the skull of this armoured dinosaur was found and so it was named *Tarchia* (tar-chee-a) which means 'brain'. It is still called 'brainy' even though many more fossilized bones have been found. *Tarchia* was as long as a coach and is Asia's largest known armoured dinosaur. It shuffled along on four legs. *Tarchia* was protected from predators by a shield of bony plates and a heavy club at the end of its tail. It fed on plants with its broad snout.

TENONTOSAURUS **110 MYA**

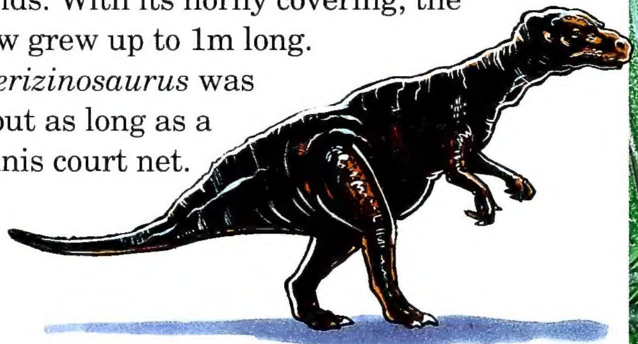
As long as an elephant, *Tenontosaurus* (ten-on-toh-saw-rus) was a plant-eater. Its fossils have been found in several parts of the USA and its name means 'sinew reptile'.

THECODONTOSAURUS **220 MYA**

An early dinosaur from Wales and south-west England, *Thecodontosaurus* (theek-oh-dont-to-saw-rus) was about the size of a large dog. It stood on two legs, had a huge, curved claw and ridged teeth. Its name means 'socket-toothed reptile'.

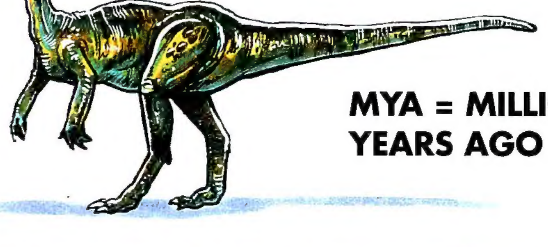
THERIZINOSAURUS **80 MYA**

Therizinosaurus (ther-ih-zin-oh-saw-rus) was a flesh-eating dinosaur from the Gobi Desert in Mongolia. It was named 'scythe reptile' after the huge, curved claw on each of its hands. With its horny covering, the claw grew up to 1m long. *Therizinosaurus* was about as long as a tennis court net.



THESCELOSAURUS **65 MYA**

A plant-eater from Canada and the USA, *Thescelosaurus* (thes-kel-oh-saw-rus) was one of the last dinosaurs on Earth. It was as long as a hippopotamus and had a small head, long tail and diamond-shaped teeth. *Thescelosaurus* means 'wonderful reptile'.



MYA = MILLION YEARS AGO

COMING IN PART 48 OF

DINOSAURS!

Which prehistoric animal is the oldest known ancestor of the horse? Find out in TIME DETECTIVE. See how giant birds and mammals lived in PREHISTORIC WORLD.

PLUS

A day in the life of *Maiasaura* in HISTORY IN PICTURES
and
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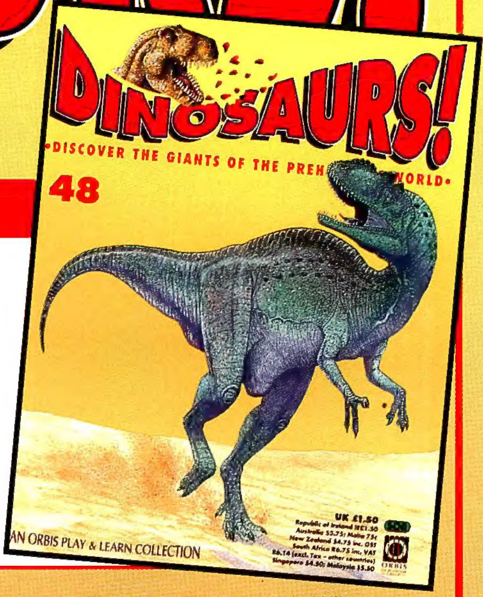
GIANTS OF THE PAST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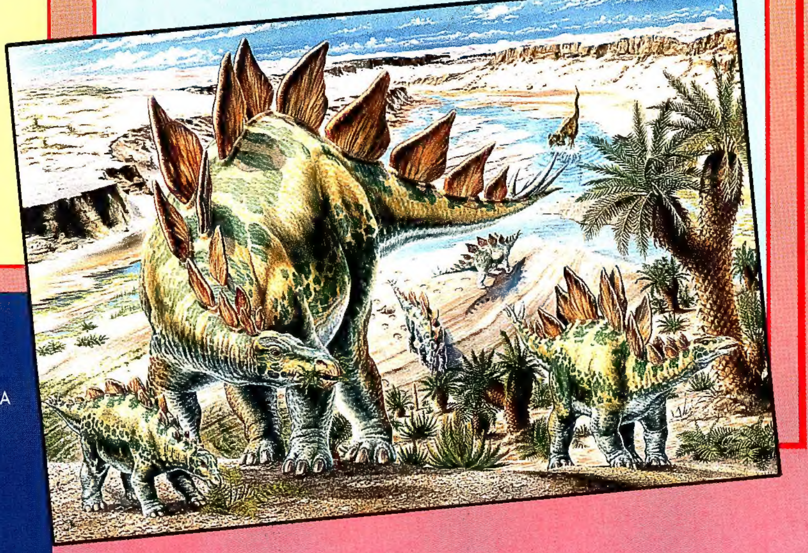
Have you ever wanted to fill your room with dinosaurs? Now you have your chance – with the *Dinosaurs!* POSTER COLLECTION. Each poster is 820 x 570mm (nearly eight times the size of this page) and features a superb dinosaur artwork. You'll find facts and figures about the dinosaur on the back – PLUS a look at some other prehistoric animals. The 14th poster is *Stegosaurus*.



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ANSWERS TO FACT FILE QUESTIONS: 1.c 2.b 3.a 4.b 5.a 6.b 7.b 8.c 9.a 10.c

Dr. David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

Is it true that all dinosaurs had two brains?

No! This myth was started by American dinosaur expert Othniel Marsh when he was describing small-brained *Stegosaurus*. He thought the dinosaur may have had a second brain in its spine when he discovered a large space above the dinosaur's hips. The truth is, this area probably contained all the tail and leg nerves which met at this point, as well as large stores of fat. But, like many myths, the idea of two brains has been very hard to shake off.

Could Allosaurus have eaten a person whole?

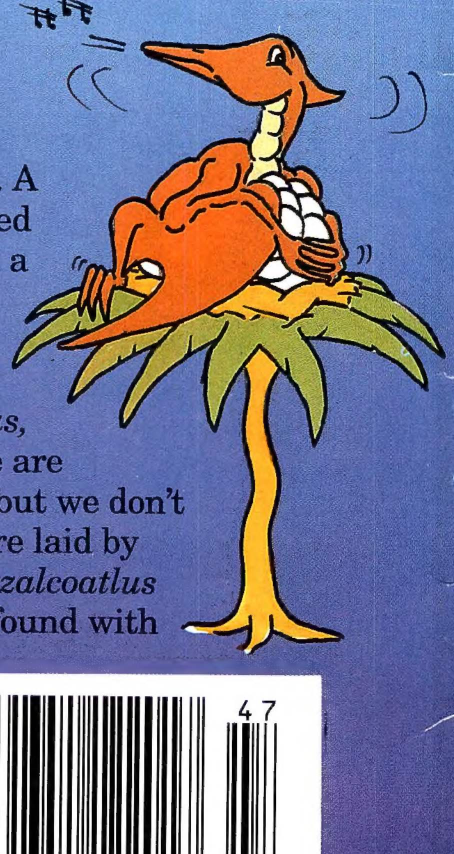
You must have been watching 'Jurassic Park'! Firstly, dinosaurs did not survive into the Age of Humans, so we will never be able to run an experiment to see if *Allosaurus* could swallow a person in one big gulp! Secondly, the head of *Allosaurus* was not quite large enough for its jaws to have completely engulfed a person. I would say a human was about two bites worth for an allosaur! One bite would have reached the waist. The second would have gobbled down the legs!

What was the largest prehistoric mammal that lived in the sea?

Some enormous whales were known to exist in the Tertiary Period and they may have rivalled the modern blue whale in size. One of them – the toothed whale *Basilosaurus* – grew to a whopping 20m long! This was much bigger than the largest reptile – the pliosaur *Kronosaurus* measured about 14m from snout to tail.

Have scientists ever found a pterosaur's nest?

There is no firm proof that pterosaur eggs or nests have been found. A collection of pebble-sized eggs was discovered in a quarry at Stonesfield, England, where the fossils of the very first dinosaur, *Megalosaurus,* were also found. These are definitely reptile eggs but we don't really know if they were laid by pterosaurs. Some *Quetzalcoatlus* fossils have also been found with bits of shell nearby, but it cannot be proved these were pterosaur eggs.



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